Chemical Week

Report

August 25, 1956

Price 35 cents

Looking for company weak spots? First place to check is your organization chart . . . p. 35

Fertilizer sales are booming, and overcrowding could well be the industry's next step . p. 18

Offshore petroleum: oil companies step up efforts to find geologic clues . . . p. 80

Chemical users can reduce inventory bodies on the way—and just in time . . . p. 70

Textile plays, lots of work: the DuPont-M a formula for customer service clinics . . . p. 86

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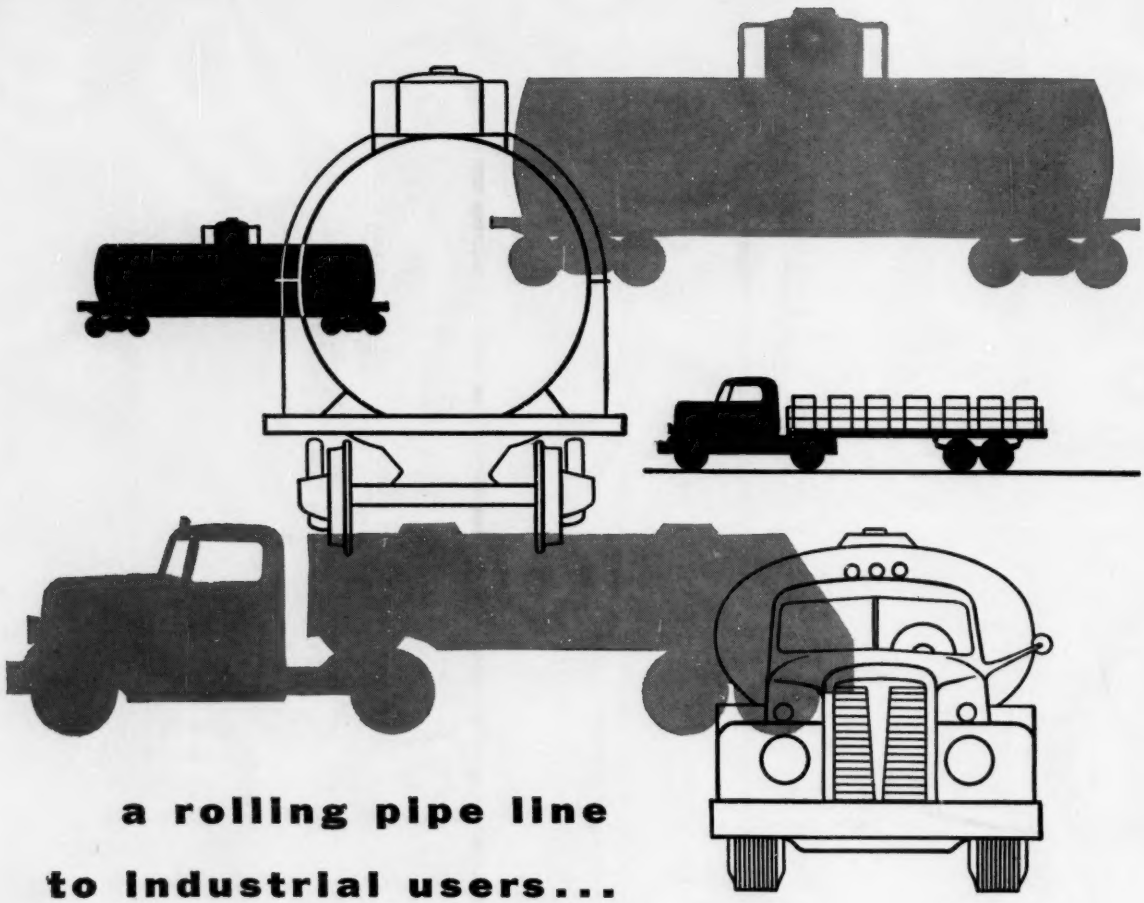

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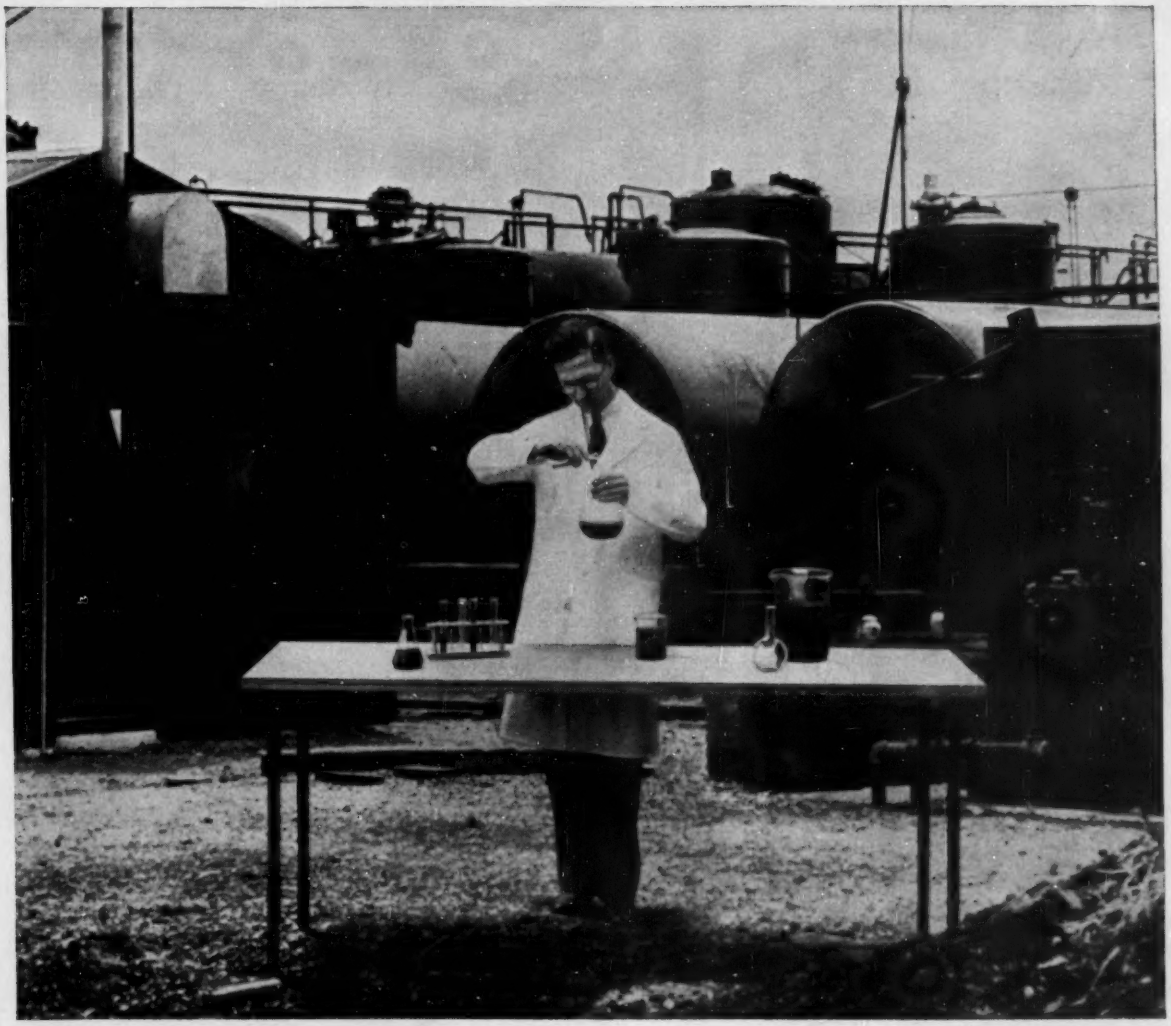

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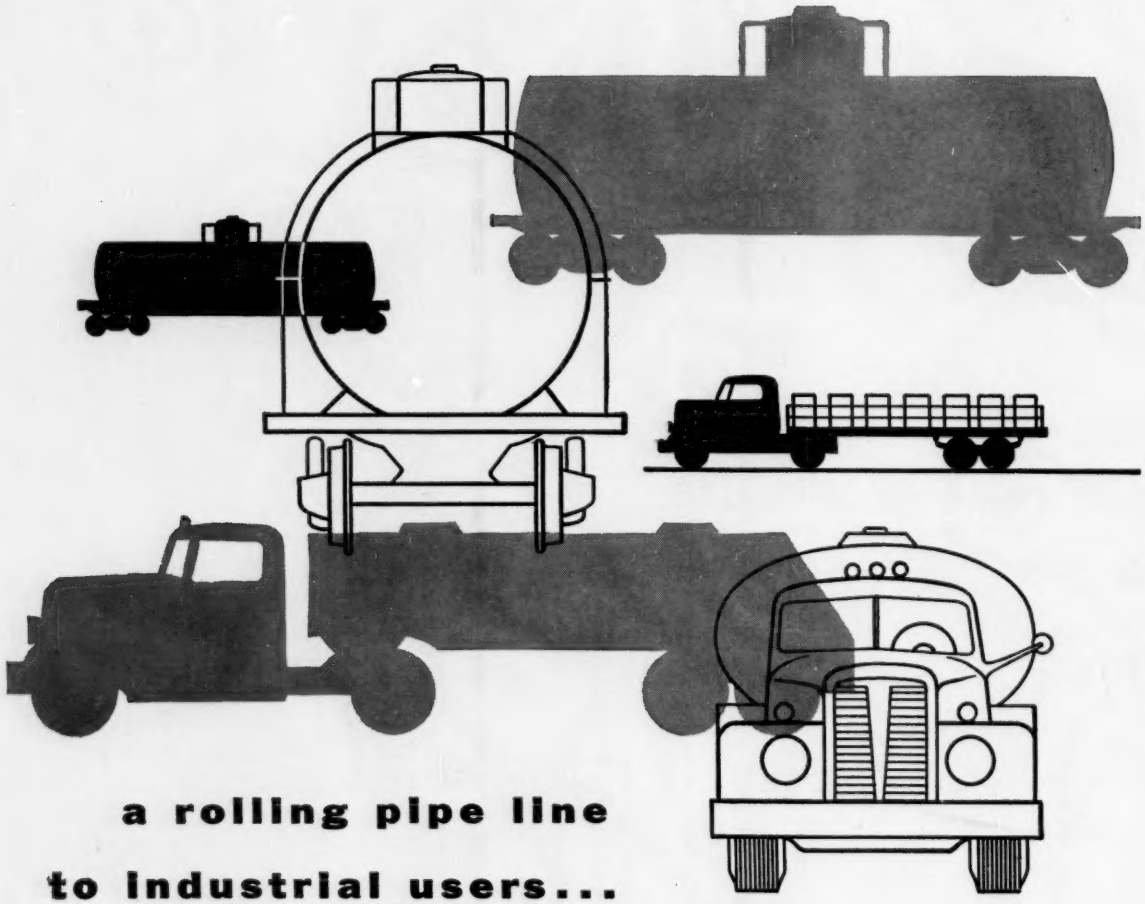

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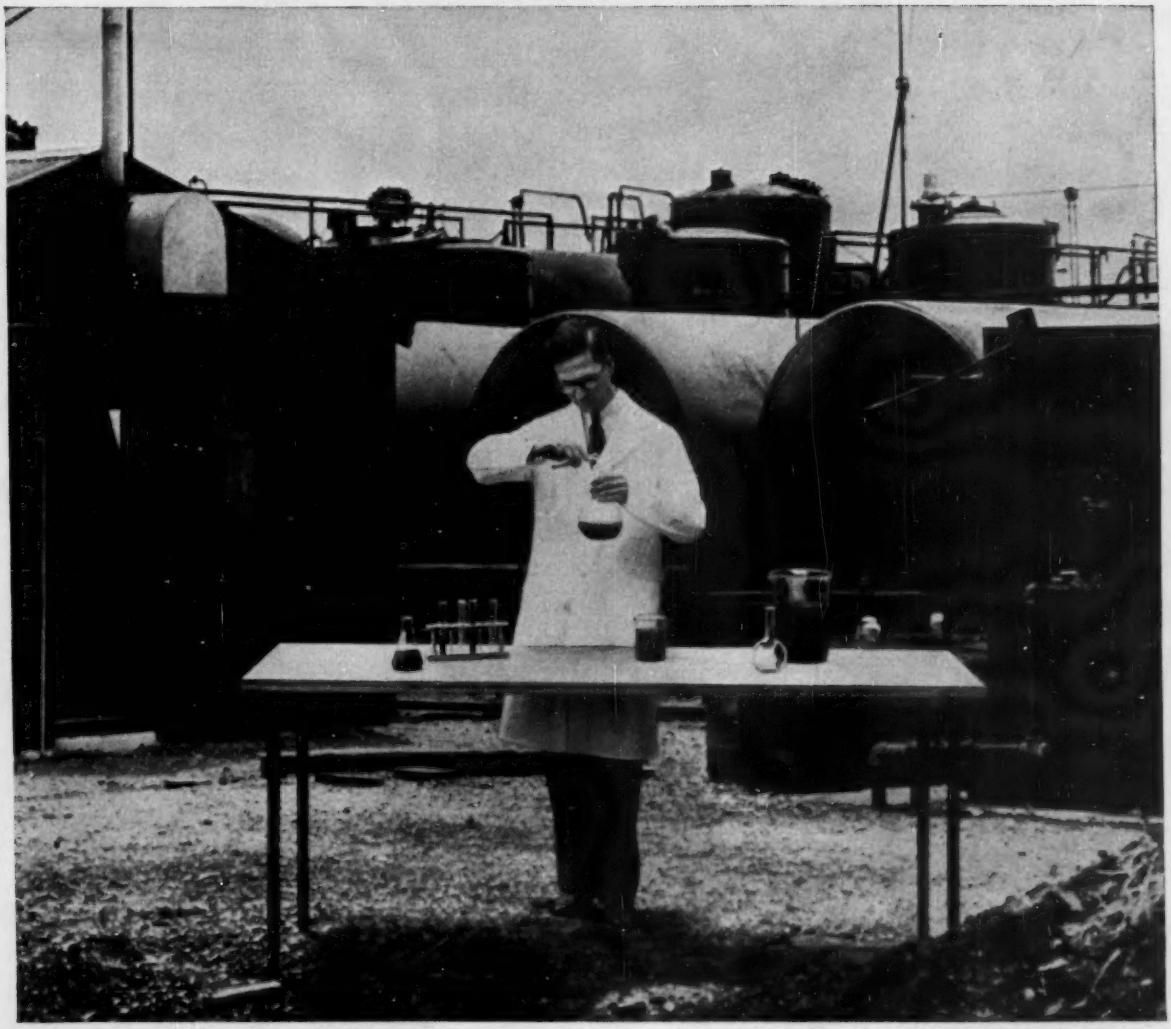

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Chemical Week

TOP OF THE WEEK

August 25, 1956

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No. 8

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Viscosity at 25°C., Centipoises	945
Specific Heat at 25°C., Cal./g/°C	0.577
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Auto Ignition Point, °F., (on glass)	804
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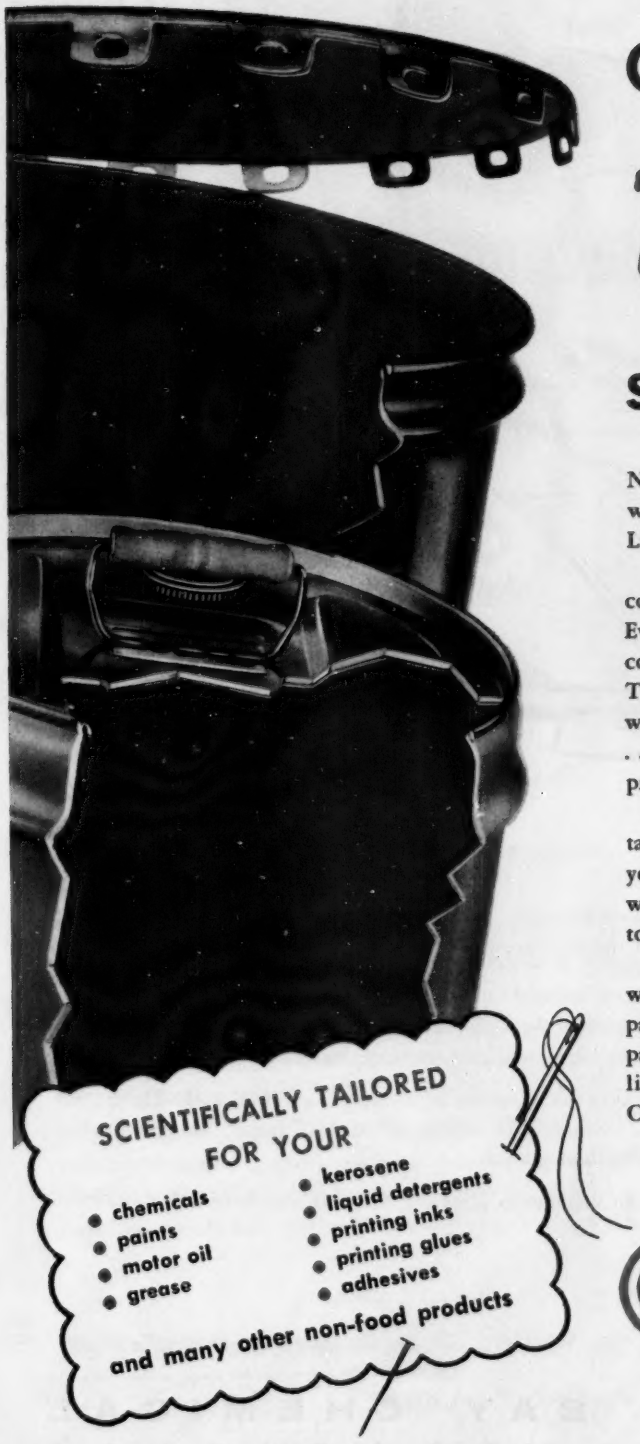

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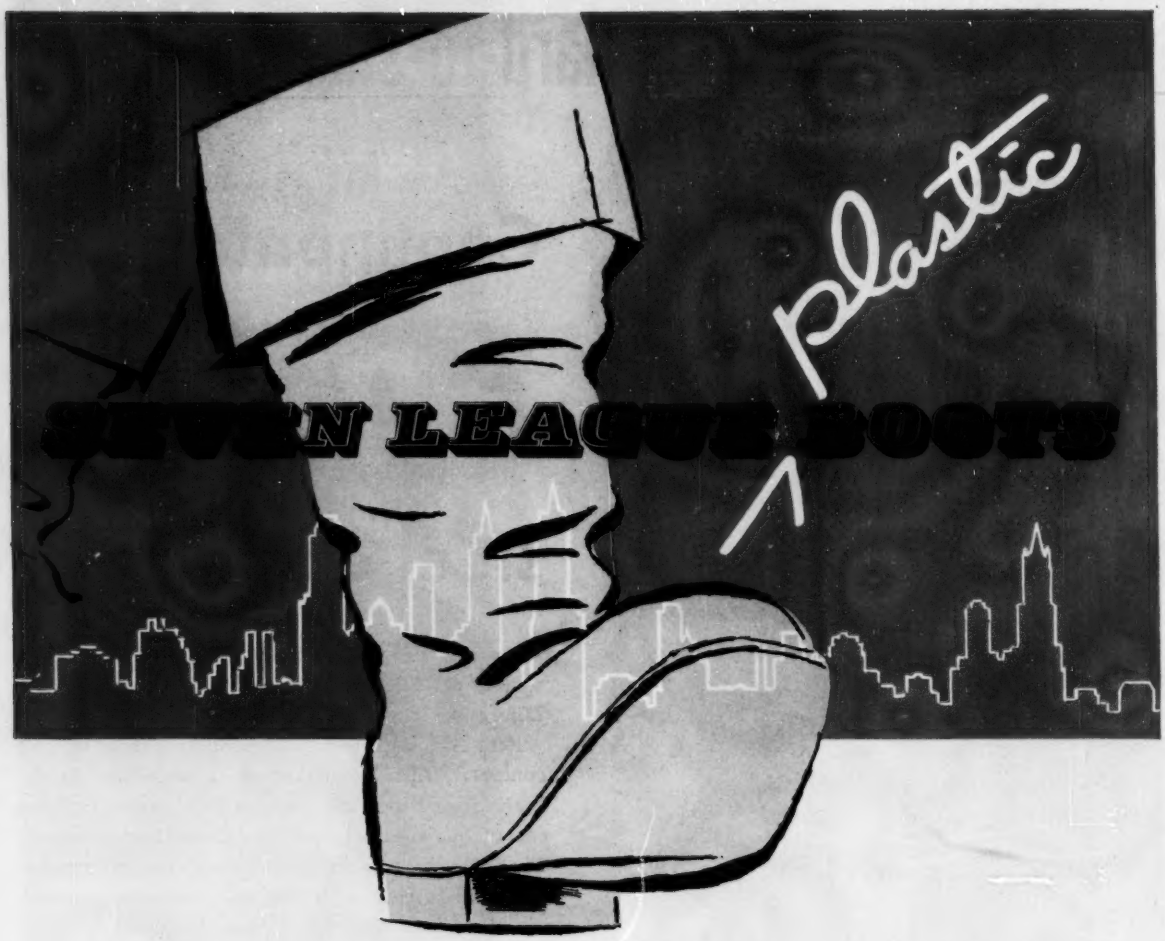

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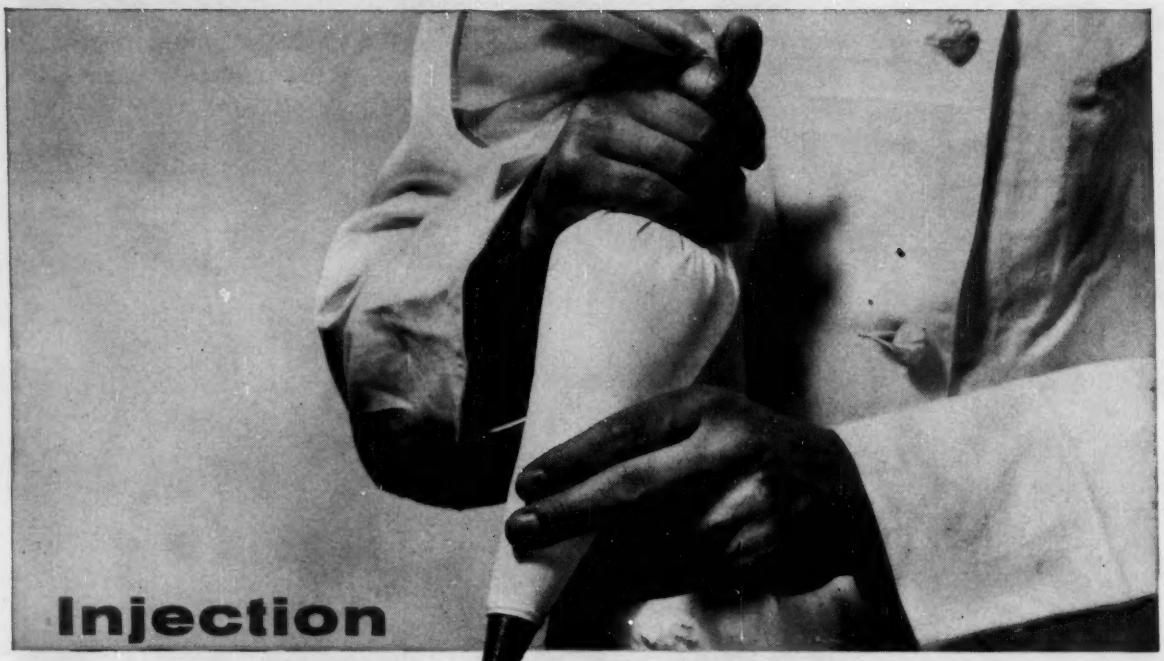

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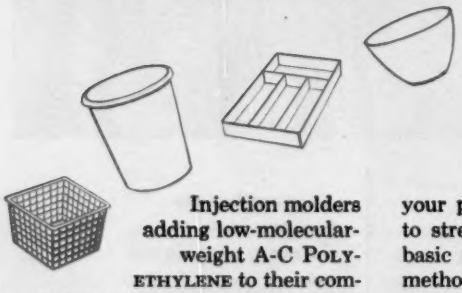

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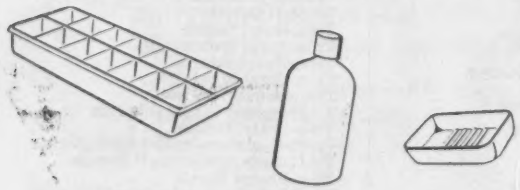

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Business
Newsletter

CHEMICAL WEEK
August 25, 1956

Take a close look at depreciation. The politicians are eyeing the subject, and you'd better join them, for, as the political campaigns get hot this fall, depreciation policy could well become an important issue. Possible changes in government regulations that affect depreciation reserves and obsolescence charge-offs are of real importance to the fast-paced chemical process industries.

While the Democrats will attack the depreciation clauses in the Republican-sponsored 1954 tax law revision (allowing companies to write off two-thirds of a plant's cost over half its useful life), this won't be the move that's important to business. Quietly, and without fanfare, a Congressional subcommittee under Wilbur Mills (D., Ark.) is pondering future tax revisions. And Mills feels that depreciation rules should be tightened.

But many businessmen take an opposite view. With industrial plant replacement costs skyrocketing, they say that laws that merely allow recovery of original plant cost over its useful life are woefully inadequate.

It's the steel companies, of course, that are leading the battle for more liberal depreciation treatment. In past years, they've been able to expand capacity mainly by filling in around current capacity—"debottlenecking." But now, as they expand to fill industry's expansion needs and to supply materials for the multibillion-dollar highway construction program, they have to build entirely new facilities at today's prices.

Since there's little hope that Congress will liberalize the law, the steel industry has taken another tack—they're asking the Administration for quick tax write-offs under the defense mobilization program begun during the Korean War. Government officials are currently studying the question of extending such depreciation benefits to those who build new plants for steel plate, structural steel and for pipes and tubing. Though they insist that the basis for decision will be whether such facilities would be needed in case of war, it's likely they will be under strong pressure from top Administration leaders to grant such benefits.

Top Republican politicians—including President Eisenhower—are already worried about increases in the general cost of living. Hence, the steel firms are in a good bargaining position: unless they get depreciation concessions, they may well increase their prices again this year. And such an increase—especially if it comes before the November elections—would be damaging to the Republicans.

If steel gets aid, will chemical companies get similar help? Probably not. The chemical industry doesn't have the recognition steel does for being basic to the U.S. economy. Too, the chemical industry is too diversified to have a single company that, like U.S. Steel, stands alone as the industry's price leader.

But there is one commodity—glycerine—that will get aid. The Office of Defense Mobilization, in about two weeks, will give tax write-off certificates for some 70 million lbs./year of synthetic glycerine capacity. A review of pro-

jected wartime glycerine needs, conducted a year ago, caused ODM to reopen its expansion goal for glycerine and to set a target of 325 million lbs./year. Deadline for asking write-offs for new capacity was June 30—and applications for more than the needed 70 million lbs. were received almost immediately.

•

Will there be new write-offs for any other chemicals? It's unlikely. Says one official: "There's no indication of other deficiencies" in possible war needs, with possibly this exception: there may be write-offs for either petroleum alkylate or butane-derived butadiene on the grounds that present supplies of refinery butylenes may be insufficient to meet demands both for alkylate (used in aviation gasoline) and for butadiene (in GR-S rubber).

•

Sales records in the industry are still holding up well (*CW, Aug. 11, p. 21*). Highlights of the week's crop of six-month earnings reports:

• General Aniline & Film first-half sales were $63,299, up 7.9% from those in the first half of '55. Net was up 50.6%, to $2,626.

• Reichhold Chemicals reported first-six-month sales of $29.5 million, a rise of 11.4% from last year. Profits dropped 5.3% to $1,022,112.

• Tennessee Corp. had sales of $41.9 million, 10.6% lighter than in Jan.-June '55. Net earnings were $5.29 million, up 30.5%.

Dow Chemical's sales were $565 million for the fiscal year ended May 31, up 20% from the year before. Net rose 59% to $59.7 million.

Here's what the first-half record shows, with 36 companies reporting:

Twenty companies increased their sales by more than 10%; 12 showed increases of up to 10%; four showed decreases. In net profits, 21 showed boosts of over 10%; nine had increases of up to 10%; six showed decreases.

But some synthetic fiber firms may have last-half troubles. Already, two synthetic cloth makers definitely plan to shut down for a week beginning Sept. 3, and many others are considering it. Estimates so far indicate that more than half the 85,000 synthetic-weaving looms may shut down. Reasons: a tough garment season, weatherwise; and overproduction in the heavily competitive cloth industry. Fiber producers are recalling the difficulties they had in 1954, when production overflowed shipping areas and filled plant corridors.

•

Wage differentials between segments of chemical workers are under attack after years of criticism by the unions. In a "no contract, no work" strike in Baltimore, 975 employees of W. R. Grace's Davison Chemical Division are protesting pay differences between fertilizer unit operators and those in purely chemical units. International Chemical Workers Union has actively raised the point for negotiation. The issue: should employees working in not strictly chemical operations be paid as industrial chemical workers? For answer, Davison says there's a question "whether [the complex plant] can carry the burden of wage scales based exclusively on chemical production."

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OPINION

Emphasis on Expansion

TO THE EDITOR: We were both surprised and disappointed to discover that you had failed to list our Brazilian plant in the article "Brazil Gears for Chemical Self-Sufficiency" (*July 7*).

Our plant, located in São Paulo, has been in production for the past two years, manufacturing a line of synthetic resins that includes alkyds, urea-formaldehydes, pure and modified phenolics, pentaerythritols and ester gums.

F. A. JOLLES
Vice-President in Charge
of Foreign Division
Reichhold Chemicals, Inc.
White Plains, N.Y.

CW *intended no slight. The intent of the article was to list only those U.S. companies operating in Brazil that have construction or general expansion plans.*

Industry Men Can Teach

TO THE EDITOR: With regard to the article "Should You Let Your Researchers Teach?" (*July 28*), I would like to question certain of the comments made therein.

First, I suspect that Professor E. T. McBee is still head of the chemistry department at Purdue. Professor Comings is head of the chemical engineering department, as I recall.

Second, I disagree somewhat with Professor Rex Robinson of the University of Washington that industrial people are of questionable value in teaching. The Polytechnic Institute ot Brooklyn, with one of the largest evening undergraduate and graduate student bodies in the country, has for many years utilized adjunct staff members obtained from the large chemical industry complex in the Metropolitan

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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New York area. Many of these part-time instructors have helped build the reputation and prestige of "Poly" in many instances because of their vast industrial background. I daresay Poly's evening schools would have a hard time procuring an adjunct staff of equal caliber if it were not for these dedicated men from industry whose teaching abilities are probably not too different from those of the regular staff.

If surveys of the scientific and technical personnel dilemma are to be taken seriously, no possible source of teachers should be allowed to lie fallow. If experience is any teacher, some 19 years in and out of college have made me feel that some teachers who are wholeheartedly attached to their profession lack many of the essentials of good instructors. If the colleges don't at least experiment with the idea of using industry's large source of teaching manpower, the battle may be lost even before its start.

RALPH TEKEL
Manager, Pilot Plant
The National Drug Co.
Philadelphia

SEE YOU THERE

National Bureau of Standards, Boulder Laboratories, conference, Boulder, Colo., Sept. 5-7.

National Agricultural Chemicals Assn., 23rd annual meeting, The Essex and Sussex, Spring Lake, N.J., Sept. 5-7.

American Institute of Chemical Engineers, William Penn Hotel, Pittsburgh, Sept. 9-12.

International Congress of Clinical Chemistry, Hotel Barbizon Plaza, New York, Sept. 9-14.

International Union of Pure and Applied Chemistry, congress on analytical chemistry, Lisbon, Portugal, Sept. 9-16.

International Congress on Catalysis, Bellevue-Stratford Hotel, Philadelphia, Sept. 10-14.

Packaging Machinery & Materials Exposition, semiannual meeting, Public Auditorium, Cleveland, Sept. 11-14.

National Petroleum Assn., annual meeting, Traymore Hotel, Atlantic City, Sept. 12-14.

Federal Wholesale Drug. Assn., meeting, The Greenbrier, White Sulphur Springs, W. Va., Sept. 16-19.

American Chemical Society, 130th national meeting, Atlantic City, Sept. 16-21.

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Acrylonitrile in Textiles

In addition to rubber and plastics, another large acrylonitrile-using area is the textile industry. Acrylic fibers, of course, account for the lion's share, but not to be overlooked are the many textile-finishing agents that may be derived from acrylonitrile. Also, cyanoethylated natural fibers are a potentially large application for acrylonitrile.

Acrylic fibers are outstandingly resistant to sunlight and outdoor exposure. These properties make them particularly suitable for clothing, outdoor furniture, ropes, filter cloths and tarpaulins. These and other uses have been discussed in numerous review articles. (See footnote).

Another area of acrylonitrile application is in textile resins. For example, wool may be rendered shrinkproof by applying resins containing acrylonitrile-chloroprene or acrylonitrile-butadiene copolymers. Rigid fabrics result when soaked in acrylonitrile-vinyl chloride or acrylonitrile-styrene copolymers. An acrylonitrile hydrolysis product, acrylic acid, may be polymerized or copolymerized to produce an excellent warp-sizing agent for nylon in tricot knitting and weaving. Effective in low concentrations, these polymers impart good adhesion and increased abrasion resistance. This results in less shedding and snagging during weaving operations.

A more recent development in the textile industry is the reaction of acrylonitrile with cellulosic fibers such as cotton. In this "cyanoethylation" reaction, acrylonitrile, under the influence of dilute caustic as catalyst, combines with the fiber to produce a material which is permanently rotproof and more resistant to acid and heat, but which retains the appearance, hand, and processing characteristics of untreated cotton. Cyanoethylation also produces changes in the dyeing characteristics, stress-strain properties and electrical properties of the fiber.

These improvements and the processes for attaining them are described in the forthcoming industry report, "Cyanoethylation of Cotton," Cyanamid being one of the contributors. Copies will be sent to interested textile chemists and engineers upon request.

* * * *

(a) Ham, Textile Research J. *24*, 597-614 (1954)
(b) Houtz, Textile Research J. *20*, 786-801 (1950)
(c) Koch, Fibres (Natural & Synthetic) *16*, 314-320 (1955)

The Cyanoethylation Reaction

Practically all organic and inorganic compounds containing active hydrogen atoms add easily to acrylonitrile's double bond. Closely resembling a Michael type of addition, this reaction is commonly known as "cyanoethylation."

In the absence of kinetic studies, one may assume that in most cases the reaction proceeds by attack of the anion of HA (A^-) on the positively charged β-carbon atom. This is followed by proton transfer from a neutral molecule of HA (or from the solvent) to the α-carbon atom:

$$CH_2{=}CHCN \longleftrightarrow {}^+CH_2{-}CH{=}C{=}N^-$$

$${}^+CH_2{-}CH{=}C{=}N^- + A^- \rightarrow ACH_2CH{=}C{=}N^-$$

$$ACH_2CH{=}C{=}N^- + HA \rightarrow ACH_2CH_2CN + A^-$$

In most reactions basic catalysts are used. However, many nitrogen, phosphorus and arsenic compounds require no catalyst, while aryl amines require an acidic catalyst. Lewis acids, such as aluminum and zinc chlorides, also catalyze the cyanoethylation of certain aromatic compounds.

This cyanoethylation reaction has been extended to include B-H, P-H, As-H, Cl-H, and Br-H as well as C-H, N-H, O-H, and S-H compounds. Among the specific classes which readily react are amines, mercaptans, alcohols, aldehydes, ketones, amides, inorganic acids and their salts, nitro compounds, activated nitriles and esters, and cyclic dienes.

Abstracts of papers describing these reactions appear periodically in Acrylo-News. Write for your copy of this continuing bibliography of acrylonitrile references.

Note: The foregoing shall not be construed to imply the non-existence of any relevant patents nor to constitute a permission, inducement or recommendation to practice any invention covered by any patent owned by *American Cyanamid* or by others, without authority from the owner of the patent.

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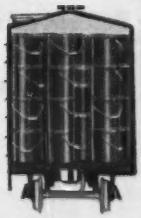

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THE MENTAL DRUG LINE-UP

1956 Sales† (million)	Generic Name	Manufacturer	Trade-name	Chief Use	Some Reported Side Effects
$45	Meprobamate	Wallace Wyeth	Miltown Equanil	anxieties	drowsiness, headache
40	Chlorpromazine	Smith, Kline & French	Thorazine	acute mental disturbances	drowsiness, nasal congestion, constipation
30	Reserpine	Ciba (and many others)	Serpasil	high blood pressure, acute mental disturbances	drowsiness, depression
5	Promazine	Wyeth	Sparine	acute mental disturbances	drowsiness, dizziness
4	Azocyclonol	Merrell	Frenquel	acute schizophrenic hallucinations	none reported
10	Piperadol	Merrell	Meratran	anxieties	none reported
	Hydroxyzine	Roerig	Atarax	anxieties	drowsiness, muscular weakness
	Benactyzine	Medicinalco Ltd.	Suavitil	anxieties	dizziness, poor concentration
	Mepazine*	Warner-Chilcott	Pacatal	acute mental disturbances	dry mouth, blurred vision

†Estimated from data compiled by Standard & Poor's.
*Not yet sold in the U.S.

Tranquilizers—Successors to Aspirin?

Makers of tranquilizers are reaping profits in the million-dollar range. The boom has already made these "mental aspirins" by far the biggest prescription drug item in the United States, and is still pushing to dizzying heights.

Tranquilizer sales, which may exceed $135 million this year, have well topped those of barbiturates and other sedatives, of antihistamines and of sulfas. They bid fair to soon outstrip sales of antibiotics.

Item: Meprobamate (*see chart*), which has been on the market for only 14 months, is already the country's largest-selling prescription drug.

Item: Doctors are now giving patients Miltown—one of the two meprobamate brands—at a 6-million-prescriptions/year rate.

Item: Ciba States Ltd., the major producer of third-ranking reserpine, sells 2½ million reserpine tablets/day.

Small wonder, then, that Thorazine-maker Smith, Kline & French shows a 32% boost in earnings for the first half of '56 vs. '55.

And American Home Products, whose Wyeth Laboratories Division sells an estimated $25 million/year worth of Equanil, showed a 53% rise in its net for the first three months of this year—latest period for which figures are available—over the same months of '55.

And this should be only a start. Dr. Rudolph Blythe, director of Smith, Kline & French's pharmaceutical laboratories, who estimates that retail tranquilizer sales in 1956 "should exceed $200 million," further predicts that total prescription tranquilizer volume will easily top $400 million within the next five years.

Two Varieties: Of course, identifying all these pacifying drugs as tranquilizers is an oversimplification. There's an important distinction to be made between the potent tranquilizers and those that might be termed antitension drugs.

Reserpine, Thorazine, Sparine and Frenquel, for example, are widely used in mental institutions, have proved effective in easing psychotic patients. These are the potent tranquilizers whose probable site of action is deep in the brain—working on the emotional centers.

On the other hand, market-leading meprobamate, marketed as Equanil and Miltown, is actually a muscle-relaxing agent derived from mephenesin, an anticonvulsant.

It's used chiefly to combat minor anxieties, and is not a potent tranquilizer, since it's not effective in treating profoundly disturbed or psychotic individuals. Also in this category: Merrell's Meratran, Roerig's Atarax, Medicinalco's Suavitil.

Open Sale? One factor that will profoundly influence the ultimate success of tranquilizers is whether they'll eventually be sold over-the-counter, i.e., without a prescription. There's little doubt that the dollar volume would rise sharply above Blythe's $400-million estimate should they become available to anyone who wants to buy them.

Such a possibility is already a major part of the future marketing plans of producers of the antitension drugs. These products, aimed at essentially normal individuals with only minor anxieties, are less potent—and so are their side effects. Hence, the Food & Drug Administration might more easily be persuaded to allow over-the-counter sales. However, a battle like the current one on hydrocortisone (*see p. 22*) could easily occur.

CHAS ADDAMS CARTOON; REPRODUCED BY PERMISSION. © 1956 THE NEW YORKER MAGAZINE, INC.

Standing Pat: The makers of the potent tranquilizers, without exception, emphasize that they don't want their products sold without a doctor's prescription. These makers point out that many people seem to feel that if a medicine gives good results, bigger doses of that same medicine will magnify its healing properties. Actually the result would probably be only to magnify unpleasant side effects. (Of course, an over-dose of prescription drugs is always a real possibility.)

Most observers feel that the chief market for the potent tranquilizers will continue to be mental institutions and doctors.

And it's by no means certain that even the antitension drugs will be available without a doctor's o.k. It will probably be a year or two before producers are convinced of the validity of such a move, and still longer before FDA approves it.

Toward Specificity: It's evident that both types have their place. And it's a good bet that the longer tranquilizers are used, the more specific the applications for a single drug will become.

There is a big temptation to try to apply a new medicine over a broad range of ailments, but, since the drugs differ widely in action, and in side effects, the trend toward specificity is certain.

Despite the phenomenal success of the tranquilizers, there are harbingers of possible future conflict. Psychiatrists and doctors continue to emphasize the seriousness of such side effects as jaundice, palsy, depression, nausea, headache, which have been reported.

In Combination: As part of their research, most producers are developing tranquilizer combinations with other drugs to combat some of the reported side effects. Ciba now has Ritalin, designed to give the patient a slight lift, counteracting the depression that sometimes develops from taking reserpine. Smith, Kline & French uses dexedrine for much the same purpose. Others are following suit.

In fact, many tranquilizers may find their major uses in combinations, which have often been found to be much more effective. The latest development along these lines is a combination of Thorazine with Pacatal, which reportedly minimizes the side effects of both drugs.

Coming Up: The astounding suc-

cess of the tranquilizers will bring new firms into the field, will spur present companies to follow through with re-intensified research. As a result, there are already many more tranquilizers under development. One large producer reports that it now has some 14 different types in development stages; it feels all of them have a fair chance of eventual large-scale production. And it is researching several others with more limited commercial possibilities.

Too, tranquilizers are being used to treat scores of maladies other than psychoses and neuroses. A partial list: alcoholism, drug addiction, menopause, hypertension, allergies, nausea, epilepsy, some cardiac, respiratory, digestive and cutaneous disturbances, and even hiccups. Ciba reports that the majority of Serpasil now being sold is used to treat high blood pressure. The demand arising for such uses is by no means small, though it isn't likely to equal the lucrative one of over-the-counter "mental aspirins."

New Barriers Raised

Several new legal barriers materialized last week to slow and, perhaps, block the proposed diversification of the assets of the Petroleum Research Fund via sale of the stock of Universal Oil Products.

The proposal to sell the stock, made by Guaranty Trust Co. (New York), fund trustee, has been approved by the American Chemical Society, which gets the profits for distribution as research grants (*CW Aug. 4, p. 35*). But it's running into spirited opposition.

• Filtrol Corp., which is definitely interested in buying UOP, filed a court petition asking that Guaranty Trust be replaced by "a responsible corporate trustee" to manage the sale of UOP stock. Filtrol had asked that a procedure be set up whereby closed bids would be submitted by interested buyers along with $5 million in cash or government securities. Filtrol now claims that Guaranty Trust has refused to sell on this basis, and has neglected to propose a "fair, impartial and objective bidding procedure" for potential buyers.

• Elmer Batzell, counsel for Independent Refiners Assn. of America, filed a strong objection to the sale with the Justice Dept. in Washington, saying that it would "tend to create a monopoly in the petroleum industry." Batzell asked the Justice Dept. to consider legal action under the antitrust law provision that bars mergers or acquisitions that tend "to substantially lessen competition or . . . create a monopoly." Batzell asserts that the sale of UOP securities would seriously threaten the existence of independent refiners.

• Sen. John Sparkman (D., Ala.), chairman of the Senate Small Business Committee, also wrote a letter to antitrust chief Victor Hansen, saying the small refiners described UOP as "the most important single source of petroleum technology."

Sparkman added: "It is my recommendation that your agency keep a close watch on whatever disposition is made of the stock and assets of Universal Oil Products Co., in order to prevent any violation of the antitrust laws from taking place."

• IRAA and a number of small refiners have already filed papers in New York supreme court in a bid to block the sale. Hearings on their motions to intervene go before the court this week.

Meanwhile, Guaranty has filed a brief arguing that since none of the independents are beneficiaries of the trust, the only claim they have is that of a charitable beneficiary.

"This is an absurdity. Private corporations operated for profit cannot be beneficiaries of a charitable trust. The Petroleum Research Fund is a New York charitable trust," the bank brief stated.

ACS backed Guaranty Trust by saying that any threat to independents' existence is "too speculative and too remote" to be a valid argument.

Even before these most recent developments, the sale of UOP was already well steeped in legal entanglements. In an advisory brief filed late last month in state supreme court, New York Attorney General Javits objected to Guaranty Trust's request for a 10% sales commission for handling the sale of UOP. Judge Jacob Markowitz has now appointed William J. O'Shea, a New York attorney, as referee in the case, instructing him to review all the evidence and give his recommendations to the court. O'Shea will be on vacation until after Labor Day, and it may take more time to get the proceedings under way.

It may be several months before the course of the UOP sale is firmly established. But if the company is sold, there's little doubt that its new owner will assume an important role in petroleum and petrochemical research fields.

Change on Bargaining

Must a company continue to bargain with a union after that union has merged or consolidated with another one? To that important question, NLRB now says "Yes."

Specifically, the National Labor Relations Board has ruled that Union Carbide must bargain with AFL-CIO's Oil, Chemical and Atomic Workers Union over contracts covering employees in its Edgewater Works in Cleveland. OCAW was formed in 1955 by consolidation of United Gas, Coke and Chemical Workers and Oil Workers International Union, both members of CIO.

The consolidation, said NLRB, does not relieve Union Carbide of its duty to bargain, even though the union originally certified as bargaining representative for Edgewater maintenance employees was the gas-coke-chemical group.

NLRB took these four factors into account in deciding:

• Carbide employees participated in negotiating the union consolidation, and registered no disapproval.

• The resulting union assumed all contractual and other responsibilities of the constituent unions.

• The two merged unions were of comparable size, and the top jobs in the new union were divided almost equally between the former groups. Thus, the certified union had not been engulfed and dominated by the merger.

• Continuity was preserved at the local union level.

Ruling's Importance: With a merger likely between OCAW and the former AFL International Chemical Workers, this ruling may have substantial importance to almost all chemical employers' future bargaining decisions.

Teamsters Open Fire

In Philadelphia this week, chemical and drug firms are among those under fire from one of the most concentrated union organizing drives ever to hit the industry.

The International Brotherhood of Teamsters—the nation's biggest union—is beginning a drive there to "organize anything that isn't nailed down."

Centered squarely in the Teamsters' sights is Wyeth Laboratories, whose 1,300 employees would be prime trophies for any union; and the union is prepared to use all its ammunition to get them. It has allocated at least a half-million dollars for the over-all Philadelphia campaign; it reportedly has set no termination date for it.

The Teamsters' national headquarters in Washington is pouring in men and money for the drive. If successful, the technique will be used in other cities. While other industries—vending machines, food processing, metal working—are also prime Teamster targets, top spot goes to Philadelphia's heavily concentrated chemical and drug business. It was selected following an extensive survey of the city by a Teamsters' headquarters research expert who broke down the industrial ingredients in the area by types and sizes of firms, number of employees, whether organized or not, wage rates, hours, and working conditions.

Some Holds Barred? Organizers under command of local chief Bernie Marcus—a long-time officer of the Teamsters' Philadelphia local—have been urged to wage an orderly, refined campaign. Their strategy: a long-range selling job to the workers through personal contacts, pamphlet distribution, home visits.

Philosophically, the Teamsters say that organizing is primarily economic warfare. The simplest—and fastest—organizing is done where the union can pressure the employer's pocketbook. To other unions, this theory falls short of the ideal of persuading employees to join a union to the mutual benefit of worker and union; in the case of the Teamsters, the employer is "organized" before his workers are.

Through an already heavy membership in over-the-road and local trucking, the union can command control over the connecting lines of industry from one ecstion of the country to another. When it goes after nonunion employees of many firms, for instance, it's easy to apply pressure by cutting off the flow of goods to their plants.

What Jurisdiction? To those who question jurisdictional rights of the Teamsters, they give a stock answer: anything connected with trucking or warehousing is fair game for the campaigners. Laboratory employees of a drug company may seem pretty remote from warehousing activities, but not so to the Teamsters.

In any case, chemical and drug management has a substantial problem ahead. Teamster Vice-President Jimmy Hoffa—who pays his business agents an average of $300 a week—has put mighty resources behind the Philadelphia job. Once Wyeth was picked, the international union's researchers went to work, put together all the facts on the company they could get. Among other things, they found—to their surprise—that Wyeth is a subsidiary of American Home Products Corp., a national firm with some Teamster contracts, but considered predominantly nonunion. This made the job bigger than originally anticipated, but made a perfect setup for using other Teamster groups to apply pressure.

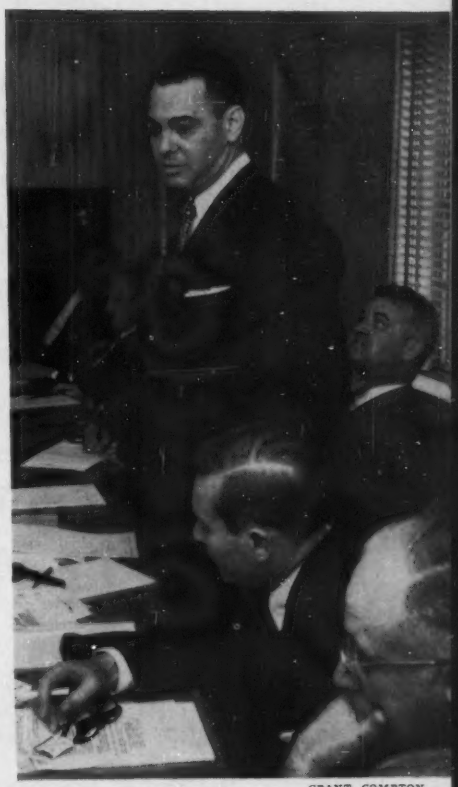
Meeting of Minds: In Philadelphia, last fortnight, the union had its organizing meeting. Its chemical and drug group made plans to obtain a full "profile" on Wyeth. Initial work has already begun—with "not overwhelming" response to leaflets distributed at Wyeth plants. As a follow-up, organizers have been detailed to get all available data on racial breakdowns, work periods, grievances—and so on—for use in leaflets directed specifically to Wyeth workers.

Much of this information must come from Wyeth employees themselves, so one of the prime assignments has been to make inside contacts. This means a breakdown on employees' outside activities—where they live and play. The plan is to then direct a barrage of union propaganda to them.

Tough to Crack: There's a feeling among organizers that it will be tough to break into Wyeth, though Wyeth spokesmen say the company has made no moves in any direction, doesn't intend to until formally approached by the union. The Oil, Chemical and Atomic Workers Union has also tried Wyeth, but has run into the firm resistance of the many middle-aged women that the firm—like many other drug companies—employs for pharmaceutical-handling jobs. OCAW is currently making its sixth try on Wyeth in four years, is also striving to unionize Smith, Kline & French.

Naturally, OCAW and the International Chemical Workers Union aren't happy—to say the least—about the Teamsters' incursions upon their "natural" prey. Besides the perennial arguments over the Teamsters' inflated jurisdiction, another union in the picture means the possibility of splitting votes three ways, instead of just between pro- and antiunion workers, when the showdown comes.

Whatever the intramural squabbles, there's one thing that stands out: union activity among chemical and drug firms is sharply expanding. Chemical business men in Philadelphia and elsewhere are girding for strong union activity.



GRANT COMPTON

TEAMSTER MARCUS: Broad jurisdiction and plenty of ammunition.

Washington Angles »

» Should sale of hydrocortisone ointments be freed from prescription-only regulations? Yes, says Upjohn and other drug firms. No, say dermatologists. Both are speaking their pieces before Food & Drug Administration officers who are considering whether such materials could be sold over-the-counter.

Here, as with mental drugs (p. 18), the volume market is the nonprescription one.

No decision is expected before early '57.

» That block to food additive control laws—a disagreement between FDA and the food and chemical industries over how thoroughly a court should review an FDA decision—will be talked about in Dallas next week, at the American Bar Assn.'s food and drug law section meeting. But there will be talk and little else; the industry-FDA rift is too great.

There's only one possibility of progress—agreement may be reached on proposals for stronger safeguards protecting additive makers and users against arbitrary rulings by FDA.

» Higher rail freight rates may be ahead, as Eastern railroads ask a 5% boost. Preliminary talks with the Interstate Commerce Commission opened last week—and a formal petition is expected momentarily.

Outlook: other rail groups will ask similar boosts; ICC will okay higher rates on the same nationwide basis it used when it okayed a 6% increase last March.

» Tank-trucking costs, too, are going up. The Internal Revenue Service has been delayed in publishing its proposed tax schedules (CW, July 28, p. 56), but now hopes to have them ready in a few weeks.

Congress voted a $1.50/lb. tax on all trucks of 26,000 lbs. and over to help meet costs of the new highway construction program, but IRS will set up classifications basing the tax on the size—not the weight—of the trucks.

EXPANSION

Titanium: Titanium Metals Corp. of America will expand its primary titanium sponge capacity in Henderson, Nev., 50% above its current 67% expansion (*CW, March 31, p 13*). Completion is scheduled for sometime in '57. Cost: $15 million.

•

Hydrofluoric Acid: Nichols Chemical Co., Ltd., Canadian subsidiary of Allied Chemical & Dye, will build a "large capacity" liquid hydrofluoric acid plant at its Valleyfield, Que., works. The plant will be the first hydrogen fluoride plant in Canada.

•

Tantalum/Columbium: Fansteel Metallurgical Corp. will expand its production of tantalum 50% and columbium 150% at a new location not yet announced. Cost: $6 million, half of which will be raised through public sale of convertible debentures.

•

Polybutene: Standard Oil of Indiana has started construction of its third polybutene unit at Destrehan, La.

•

Pulp and Paper: Champion Paper and Fibre Co. will expand its Canton, N.C., pulp plant by 150 tons/day—to 1,100 tons/day. Expansion plans also call for enlargement of chlorine and caustic facilities by 15 tons/day—to 85 tons/day.

•

Polyester Fiber: Du Pont will expand its 40-million-lbs./year Kinston, N.C., Dacron polyester staple and tow plant by 25%. Construction will be completed in the second quarter of '57.

COMPANIES

Vanadium Corp. of America has registered $10 million worth of convertible subordinated debentures with Securities & Exchange Commission. The bonds will be offered to stockholders at the rate of $100 of debentures for each 13 shares of common stock held of record on or about Sept. 5. Proceeds will be used for accelerated expansion in Jefferson County, Ohio.

•

Borden Co.'s Chemical Division has acquired all the domestic and foreign holdings of Pioneer Latex and Chemical Co. on an exchange of stock basis.

•

Bestwall Gypsum Co., recently spun off from Certain-Teed Products Co., expects to pay stock, rather than cash, dividends during the next three to five years. Earnings will be used to finance a $32-million expansion program. The company is buying sites for construction, and has provided for acquisition of a 100-million-ton gypsum reserve in Nova Scotia.

FOREIGN

Ammonia/India: Travancore Ltd. will spend $4.1 million to up its production of ammonia at Alwaye to an 80-tons/day rate within the next two years. Also planned: a hike in ammonium sulfate production, and initial manufacture of ammonium phosphate.

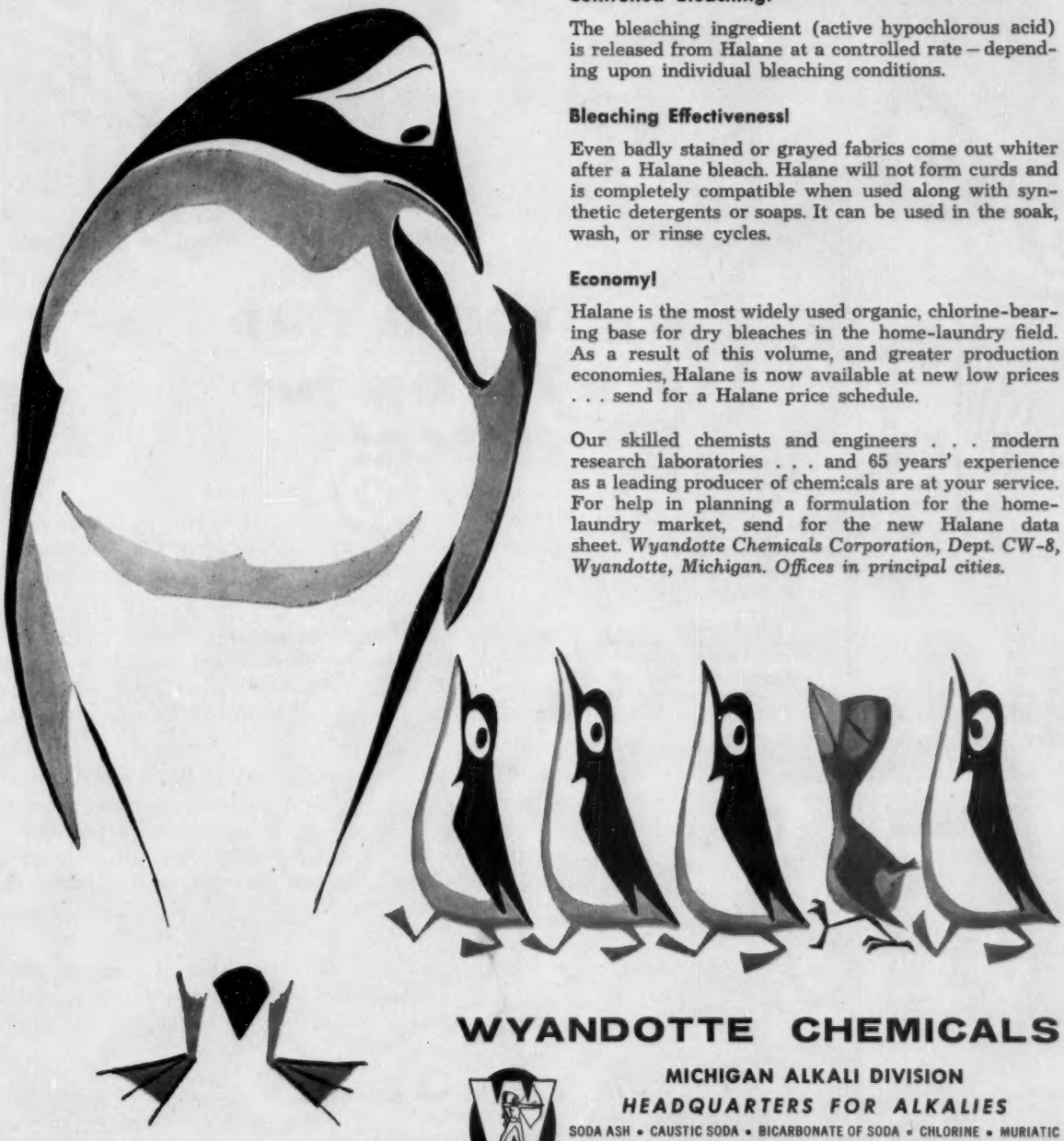
•

DDT/Mexico: Montrose Chemical of California will build a $4-million plant in Irapuato. It's scheduled to produce 20 tons/day of chlorine, 20 tons/day of caustic soda, 4,000 tons/year of DDT.

•

Acids/Philippine Islands: Atlas Consolidated Mining & Development Co. will build an acid and fertilizer plant near its Toledo copper mine. Projected capacities: 120 metric tons/day of sulfuric acid, 25 metric tons/day of phosphoric. Initial production will be 96,400 tons/year of mixed fertilizer, 19,700 tons/year of superphosphate, and 11,100 tons/year of triple superphosphate. Cost: $3.25-$3.5 million.

Check your home-laundry dry bleach requirements



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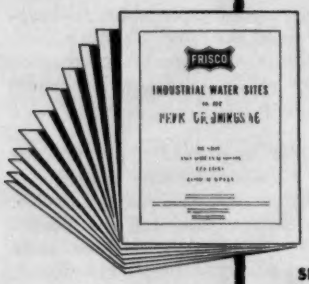

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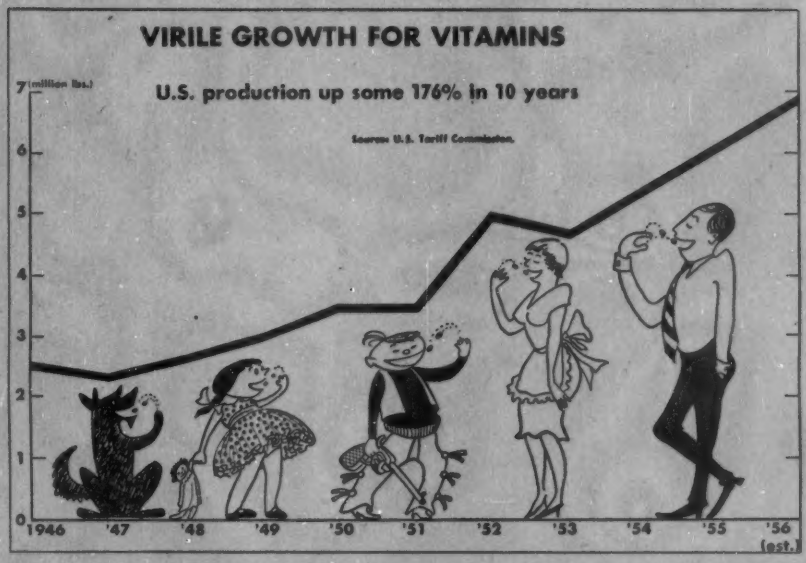
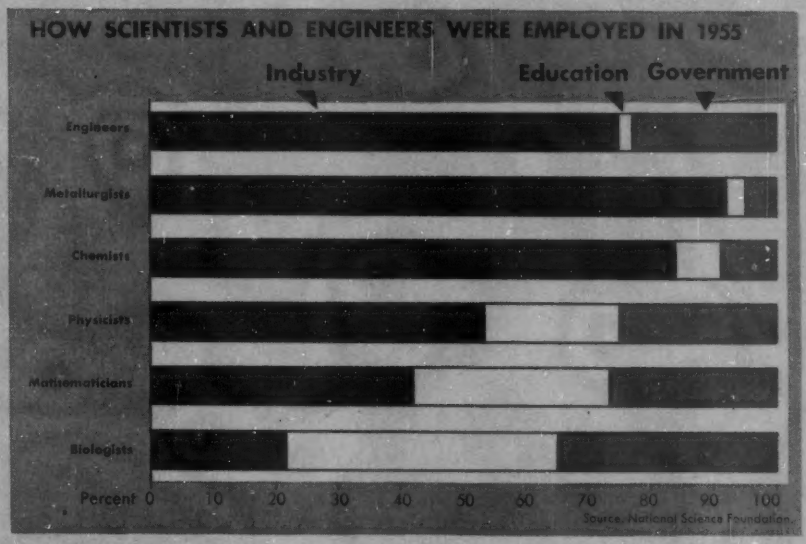
Charting Business

CHEMICAL WEEK
August 25, 1956



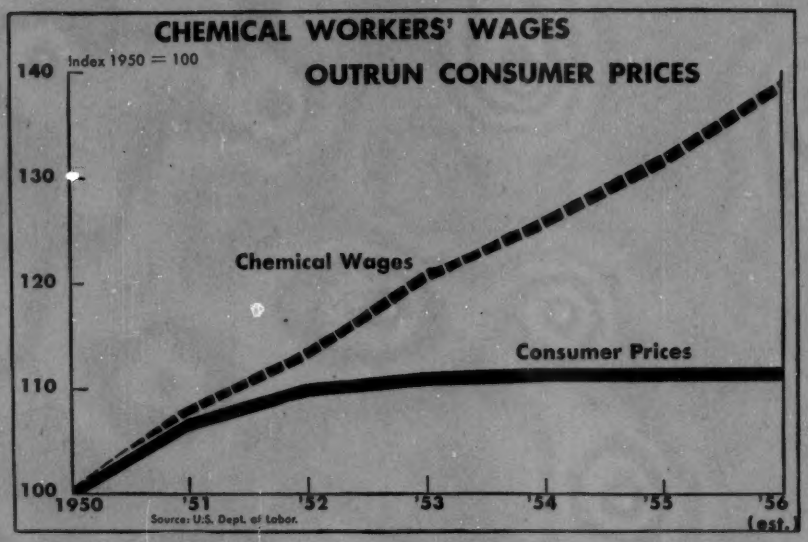
FEW INDUSTRIES in the U.S. have experienced, over the last 10 years, as peppy a growth rate as have vitamins. Production in '56 is still up, may well hit an impressive 6.9 million lbs., some 0.8 million more than last year. First-half output of ascorbic acid (vitamin C) and of niacin and niacinamide, (the groups currently accounting for more than two-thirds of the total vitamins produced) is expected to far exceed production for the comparable '55 period. The gains: 26% for ascorbic; about 11% for niacin and niacinamide.



MORE SCIENTISTS and engineers in the U.S. are working on government projects (federal, state, local) today than ever before. Industry, of course, continues to engage the greater number of these professional people, but is yielding slightly to government in roads. Last year, for example, 67.5% of all scientists and engineers in this country were in industry; 21.5% in government work; 11% in education. During '51, the previous peak year, the score was 72% in industry; 13.5%, government; 14.5%, education.

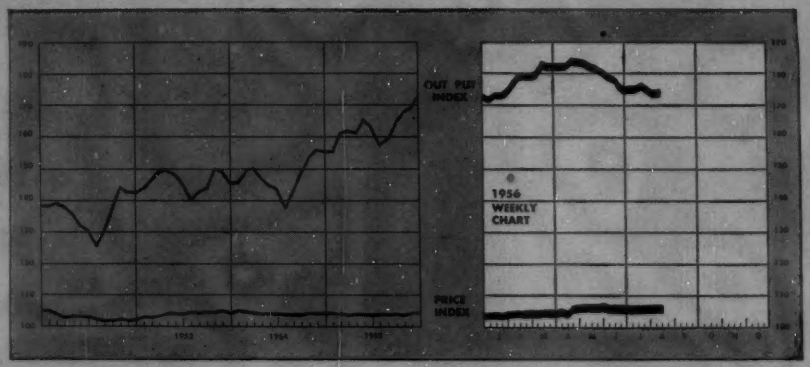
Charting Business

(Continued)



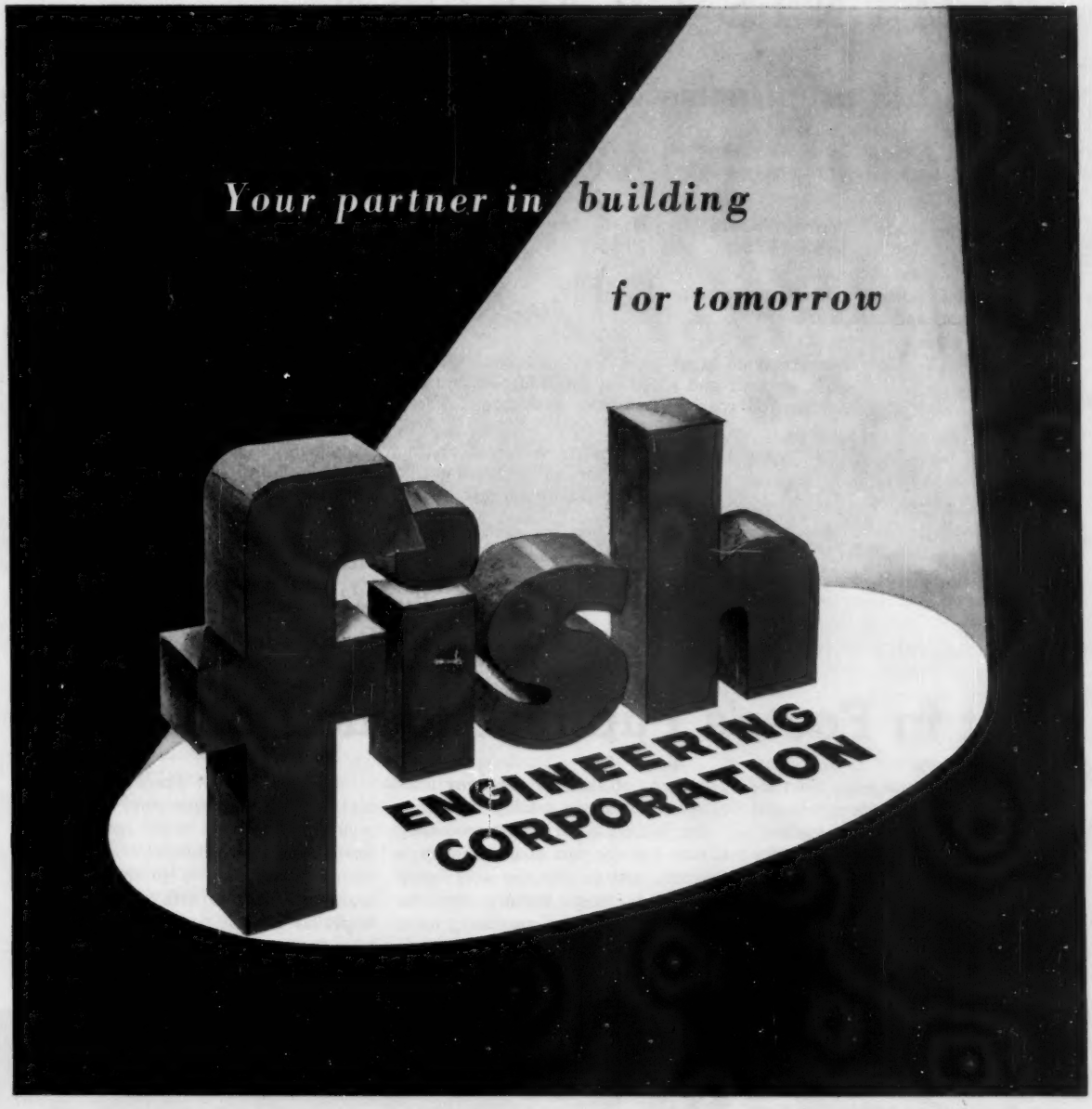
AVERAGE WAGES of chemical production workers are keeping well ahead of increases in the cost of living. Since 1950, their weekly pay has increased more than three times as much as consumer prices. In '50-'52, chemical wages and consumer prices rose apace, resulting in little real gain for the worker. Since then, however, prices have remained relatively steady, while average weekly chemical industry wages have continued to climb.

BUSINESS INDICATORS



WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947-49=100)	174.5	174.0	159.3
Chemical Week Wholesale Price Index (1947=100)	105.5	105.4	104.5
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	489.8	490.7	446.2

MONTHLY Trade (million dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	27,709	27,814	27,111	49,060	48,566	43,779
Chemicals and allied products	2,052	2,097	1,985	3,536	3,479	3,024
Petroleum and coal products	2,590	2,633	2,386	2,922	2,828	2,713



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CHRONOLOGY OF CHANGING OPERATIONS: 80 YEARS OF DIVERSIFICATION

(Foote Mineral Co.'s transformation—under five presidents—from jobber of mineral samples to integrated producer of high-purity metals and chemicals)

A. E. Foote	Warren Foote	H. C. Meyer	Gordon Chambers	L. G. Bliss
1876-95	1895-1936	1936-52	1952-56	1956-
Collecting and selling mineral specimens, meteorite pieces and ores, 1876-1916.				
	Production of tungsten, cesium and strontium compounds; grading and refining ores for glass, ceramic and metallurgical industries; supplying rutile and other specially processed welding-rod coating materials; powdered zirconium metal.			
		Processing of ferroalloys and other metallurgical materials; lithium salts for multipurpose grease and other applications; ductile zirconium and titanium metal sheets and wires.		
			Mining and refining of lithium ores; research on production of transistor-grade silicon; high-purity manganese and hafnium metal; intensified laboratory and market research.	

Glint in Foote's Future: Atomic Dollars

It wasn't always this way, but two-way integration* is now the watchword at Foote Mineral Co. (Philadelphia); a 24-hour lookout has been posted for spotting suitable acquisition opportunities; and the company is already making several products that will likely be its big meal-tickets in the atomic decades.

Back in the days of the late Warren Foote, a stern and strong-minded Quaker whose professorial father founded the concern in 1876, rapid growth was frowned on as undignified —and also too much bother. The firm gradually grew and progressed along the straight and narrow path that its owner decreed, but his firm grip—on the reins, on the brake and on the finances—guaranteed there'd be no pellmell hurtling toward the summits of corporate success.

Warren Foote showed no interest in taking over primary production of the raw materials his company needed. He often opposed, occasionally accepted reluctantly, suggestions by his lieutenants that the company go more deeply into chemical and electrolytic processing of some of the many minerals carried in the catalog.

But that era is over. Such processing is now a major part of the company's business, and is also the area being scrutinized most intently by the new, expansion-conscious management team of this 80-year-old firm.

Example: one of the biggest undertakings this year at Foote's research and development laboratory in Berwyn (15 miles west of the company's headquarters in Philadelphia's Germantown section) is production of high-purity silicon, with which Foote hopes to become an important supplier to transistor makers.

Foote has also started a $2-million

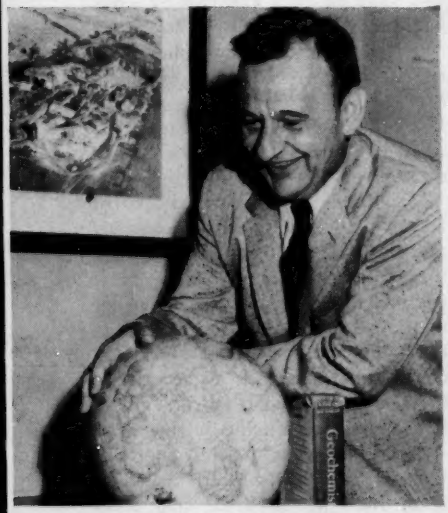
KINGS MOUNTAIN MINES: For $350,000, lithium deposits to last 50 years.

*Expanding back into production of minerals, expanding forward into more advanced processing.

CHAMBERS, BLISS: In founder's ore specimens, they see new opportunities.

expansion job at the Knoxville plant of its Electromanganese Division, the formerly independently owned Electro Manganese Corp. acquired by Foote earlier this year. Lesser current projects include a more than $500,000 enlargement of lithium mining and refining facilities at Kings Mountain, N.C., and expansion at Foote's oldest active plant—Exton, Pa.—to increase output of chemical and metal products for the steel industry.

'Go-getter' Policy Stressed: In past years, most of Foote's bread-and-butter items have been procured or developed in response to other industries' requests for materials either not yet known or not readily available. Now, however, management is organized with an eye to anticipating bright new product-line opportunities before those markets open up, is looking around for new investments that'll put the company in a position to go after those markets.



SECRETARY ENCK: Lookout man.

Spurring the growth and diversification program is ex-ordnance officer Gordon Chambers, who's been with Foote since 1928, served as president from '52 through '55, and in January succeeded H. Conrad Meyer—who retired after half a century with the company—as chairman of the board. In close accord on this policy are President L. G. (Tony) Bliss and Secretary Ernest Enck, who came to Foote in '33 and '26, respectively.

Bliss and Enck head up a management committee (including Chambers, two other board members) that studies and advises on nearly all top policy problems: economics, expansion, finance, organization, personnel, product and market development, and long-range sources of supply. Also represented are the production and engineering, finance, research and sales functions.

So far, the new managerial line-up appears to be getting along swimmingly. Despite two adverse factors —expenses of the Electro Manganese acquisition, and a dip in metallurgical sales due to anticipation of the recent steel strike—sales for the first six months of this year were up 29.1% to nearly $12 million, and net earnings climbed by 48.5% to $970,410.

Atomics in Firm's Future: Aside from the bet on nearly 100%-pure silicon as a money-maker in transistors, Foote is looking on three of its products—manganese, hafnium and lithium—as likely winners in years to come.

Foote—after providing most of the zirconium for the reactor engine in the atomic-powered submarine *USS Nautilus*—has dropped out as a major zirconium supplier to the Atomic Energy Commission. But Chambers is confident that Foote will be prominently in the picture whenever the country starts large-scale construction of atomic engines and power plants for ships and planes.

Hafnium—of which Foote is still the nation's only refiner—is also used in fission reactors, but in a different way: it's an excellent heat-resistant, neutron-absorbing material for the rods that control the pile reaction.

Still more glamorous—both in scientific and economic possibilities—is lithium, which Foote has dealt with for nearly 30 years. Lithium could well be the principal fuel used by the U.S. and Russia in striving to harness atomic fusion for commercial and industrial applications—with neutrons and heavy hydrogen as the other ingredients. Foote believes its lithium deposits on the Kings Mountain site —which it purchased from Allied Chemical in 1951 for just $350,000 —"can support our refining operations at foreseeable rates for at least 50 years."

Foote isn't banking completely on those atomic energy dollars by any means. The company is maintaining its strong position as supplier to the welding, ceramic and steel industries, and has big plans for high-purity manganese in high-temperature alloys and electrolytic aqueous-phase chemicals. Treasurer John Gates notes that $1 invested in Foote stock just eight years ago would now tally $33.20, predicts further rises as rapid amortization and depletion allowances provide higher cash flow that will be available for expansion over the next five years.

Sound and Fury in Chemical Overtones?

The decision of Metals Disintegrating Co. (Elizabeth, N.J.) to fight charges that it violated a municipal antinoise ordinance may help establish new benchmarks for plant-community relationships and help resolve the problem of residential encroachment on industrial areas.

The complaint against the metals company—filed July 18 by Edwin J. Wargins, president of the Townley Civic Assn. and a resident of the Townley residential area located near the metals plant—charges that the plant noises are in violation of a 1953 ordinance prohibiting "disturbing noises."

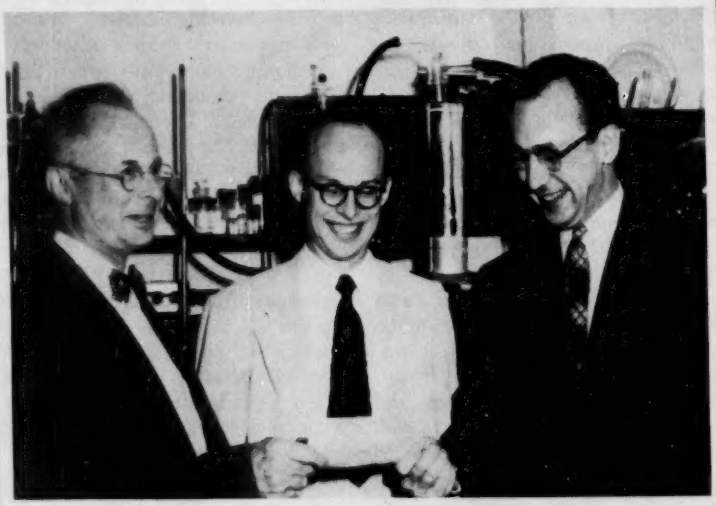
Defense Witnesses: The metals company—which elected to begin an all-out fight on the municipal level—produced residents of the area who said they heard the plant noises, but were not disturbed by them. The company also introduced three experts on sound—all members of the Committee on Hearing and Bio-acoustics of the Armed Forces National Research Council—and results of noise-level readings that placed the level in front of the metals plant at 78 decibels, and at 80 db. in front of another plant in the area.

The metals company—which makes metallic dusts and powders—began operations in the area in 1919. Later, part of the area became residentially zoned.

Motion for Dismissal: Defense Attorney Thomas L. Morrissey has asked Magistrate Archibald A. Wacker to grant a dismissal of the charges on the grounds that Wargins has not proved violation of the ordinance, that the ordinance fails to establish definite requirements, and that it violates the constitution in denying due process of law. Wacker has indicated that he will hand down a decision this week—both on the motion and the case.

LOREN C. HURD: 'Fundamental issues that have to be resolved.'

If the decision goes against the metals company, an appeal will be taken to a higher court, company President Loren Hurd promises. "This case involves fundamental issues," he declares. "Encroachment of residential areas upon industrial zoning is a very real threat to established industry."



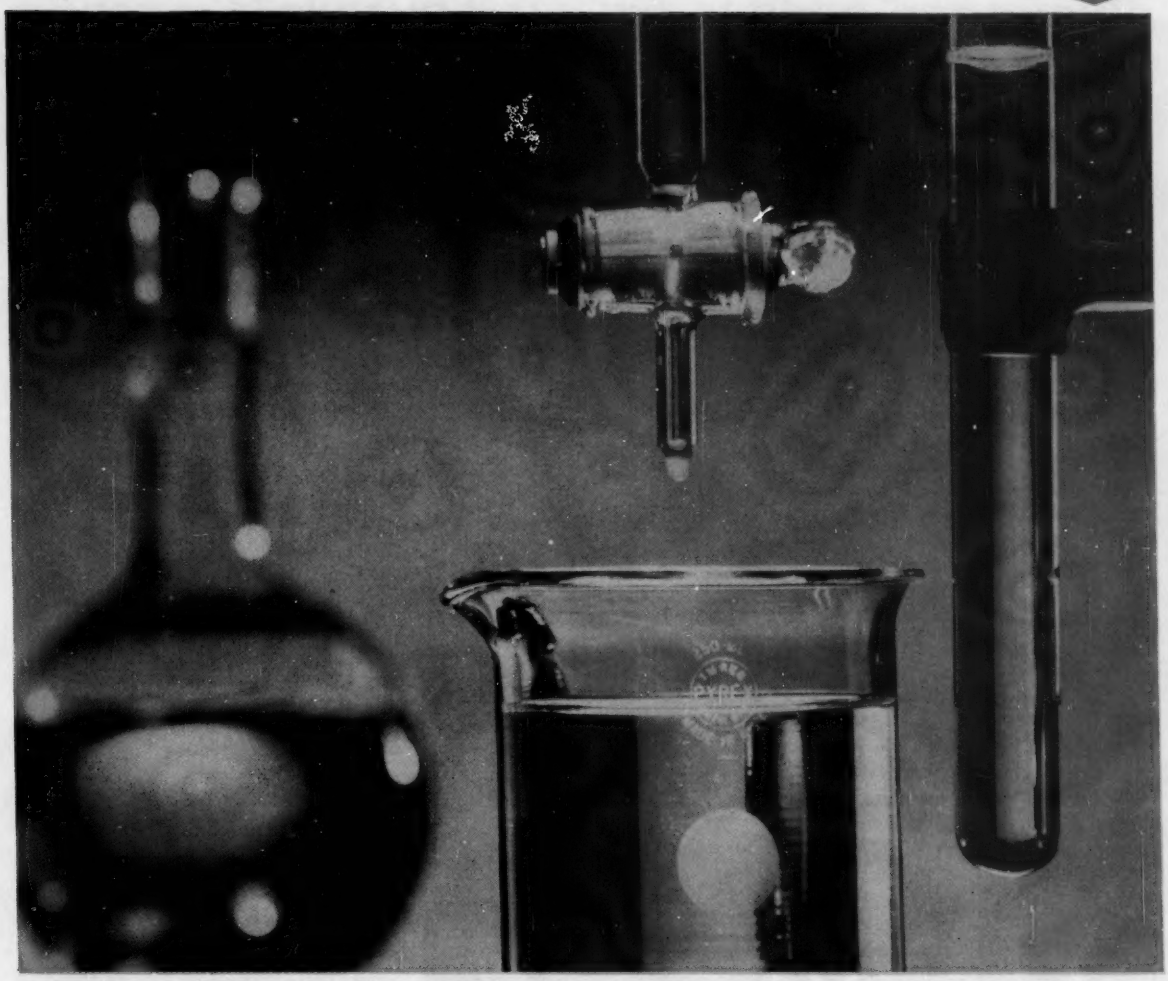
Back to School—with Checks

CHEMICAL EXECUTIVES have been trooping back to college campuses during recent weeks, but instead of textbooks, they now tote company checks for educational grants in various forms. Some donations—like that of Interchemical Corp., being presented by General Manager Zeno Wicks, Jr. (*right*), of the company's Central Research Laboratories, to Director P. A. van der Meulen (*left*) and Professor Broderick Barnes of Rutgers University's School of Chemistry—are for specific research projects. Other firms are donating for scholarships, graduate fellowships and general college costs.

LEGAL

Hall Patent Valid: The federal court in Richmond, Va., has ruled that U.S. patent 2,513,094—owned by Hall Laboratories, Inc. (Pittsburgh)—is valid and was infringed by Kingan, Inc. (Indianapolis). The patent covers the use of certain phosphates in the curing of meat, a process used by most major meat packers in the U.S. and Canada for retaining the natural color in hams and other cured meat products.

Hall Laboratories, a subsidiary of Hagan Corp.—a Pittsburgh chemical and control manufacturer—has filed four additional suits against meat packers for alleged infringement of the same patent. The suits—asking treble damages plus legal fees and court costs, as well as an accounting for past infringement and an injunction against continuing infringement—are pending in federal court in Philadelphia against Karl Seiler & Sons, Inc., Millar Bros., and John Engelhorn & Sons, Inc.; in New York



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you can depend on DOW *CHEMICALS* DOW

City against Plymouth Rock Provision Co.; and in Dallas against Samuels & Co., Inc.

•

Stock Sale Case: A hearing got under way this week in the federal government's case against Wyoming Gulf Sulphur Corp. (Jersey City, N.J.) and John McBride—president of the corporation. Federal Judge John M. Cashin in New York had ordered the defendants to show cause why they should not be cited for criminal contempt for violation of a permanent injunction forbidding the sale of Wyoming shares to the public.

Asst. U.S. Attorney Arthur Christy maintains the company and McBride violated the injunction in selling more than 100,000 shares since the Securities & Exchange Commission first won a restraining order late in 1954. He says the sales were carried out through brokers in California and Canada.

•

Coal-Tar Dyes: The Food & Drug Administration should be given the power to set use levels for coal-tar dyes found to be harmless when added to foods, drugs and cosmetics in certain concentrations, according to a report by a special seven-man advisory committee appointed by the National Academy of Sciences at the behest of FDA.

The committee—headed by William J. Darey, Vanderbilt University biochemist—said that certification of a compound as "harmless and suitable for use," as required under present law, was "unrealistic unless the level of use is specified."

The committee reported that of the 116 dyes certified under the 1938 Food, Drug and Cosmetic Act, only 15 have been studied by FDA to some extent since 1945, resulting in decertification of three and a more intensive study of seven others. Only five of the 15 have not manifested some deleterious effect on experimental animals, the committee said.

LABOR

Hiring Rates Up: Chemical companies have been taking on new employees—including many for summer jobs—at a considerably stepped-up rate. In plants making chemicals and allied products, the hiring rate jumped from 1.9 per 100 employees in May to 3.2 in June, according to a Labor Dept. report out last week. Separation rate for this entire industry inched up from 1.6 in May to 1.8 in June.

But the hiring is not uniform in all company departments; chemical companies are continuing to augment their office and sales staffs more than their plant forces. In June, there was a loss of 6,200 production and maintenance workers contrasted with a gain of 4,000 salaried employees; and over the past year, the personnel increase for the industry as a whole was 23,800 —of whom 55.1% were salaried employees.

•

Concurrent Bargaining: Latest example of how the chemical labor unions are trying to coordinate bargaining on a company-wide or industry-wide basis: recent agreements between six companies and three unions covering nine plants with 9,500 workers—an estimated 95% of all employees in the wet-milling industry in the U.S.

OCAW'S SCHAFER: In one process industry, concurrent bargaining.

Coordinating these negotiations—which were conducted on a company-wide basis—was the Corn Council of the Oil, Chemical & Atomic Workers (AFL-CIO). OCAW Vice-President B. J. Schafer—who serves as coordinator of this council—kept the individual bargaining committees informed of developments during the concurrent drive for wage increases, which ranged from 11¢ to 15¢/hour at the various plants.

KEY CHANGES

Donald A. M. Mackay, to associate director of research, Evans Research and Development Corp. (New York).

Edward P. Heath, to product manager, "all" detergent, Monsanto Chemical (St. Louis).

Russell L. Haden, to manager, Organic Chemicals Division; and **Thomas G. Gibian,** to manager, Battery Separator Division; Dewey and Almy Chemical Co. (Cambridge, Mass.), division of W. R. Grace & Co. (New York).

F. C. Nicholson, to general manager, Chemicals Division; **David N. Hauseman,** to general manager, Agricultural Chemicals Division; **W. N. Watmough, Jr.,** to general manager, Mixed Fertilizer Division; **R. D. Goodall,** to general manager, petroleum catalysts group; **A. R. Worrall,** to general manager, industrial chemicals; and **D. P. Barrett,** to general manager, rare earths; Davison Chemical Co. (Baltimore), division of W. R. Grace & Co. (New York).

Richard M. Jones, to sales manager, Southern States Chemical Co. (Atlanta).

James Dillon, to director, National Starch Products, Inc. (New York).

John W. Girvan, to vice-president, sales, Tesco Chemicals, Inc. (Atlanta).

C. G. Bensinger, to president, Glass Container Division, Owens-Illinois Glass Co. (Toledo).

E. F. Sanders, to manager, Tissue Product Dept., Pitman-Moore Co. (Indianapolis).

J. J. Mikschl, to sales manager, Raymond Laboratories, Inc. (St. Paul).

C. C. Hooper, to manager, Corpus Christi Division, Southwestern Drug Corp. (Dallas).

Robert P. Ogden, to general manager, Industrial Quimica Pennsalt S. A. de C. V. (Mexico City), subsidiary of Pennsalt International Corp. (Philadelphia).

DIED

Martin Butler Gentry, 69, former vice-president, Freeport Sulphur Co. (New York), at Southern Pines, N.C.

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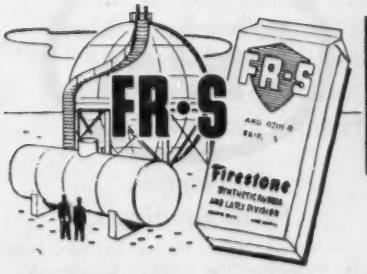

Firestone

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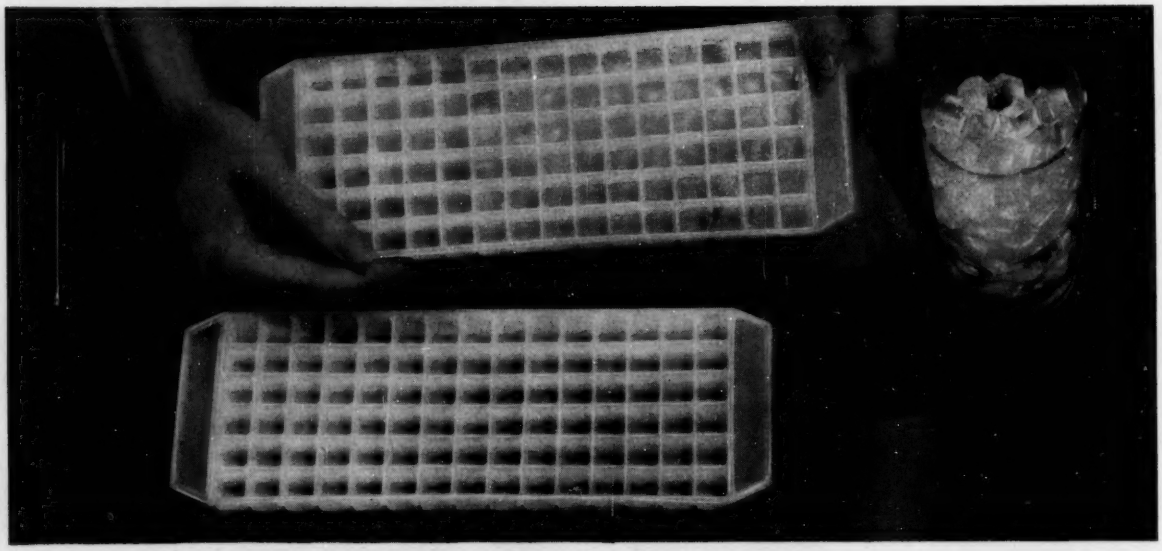
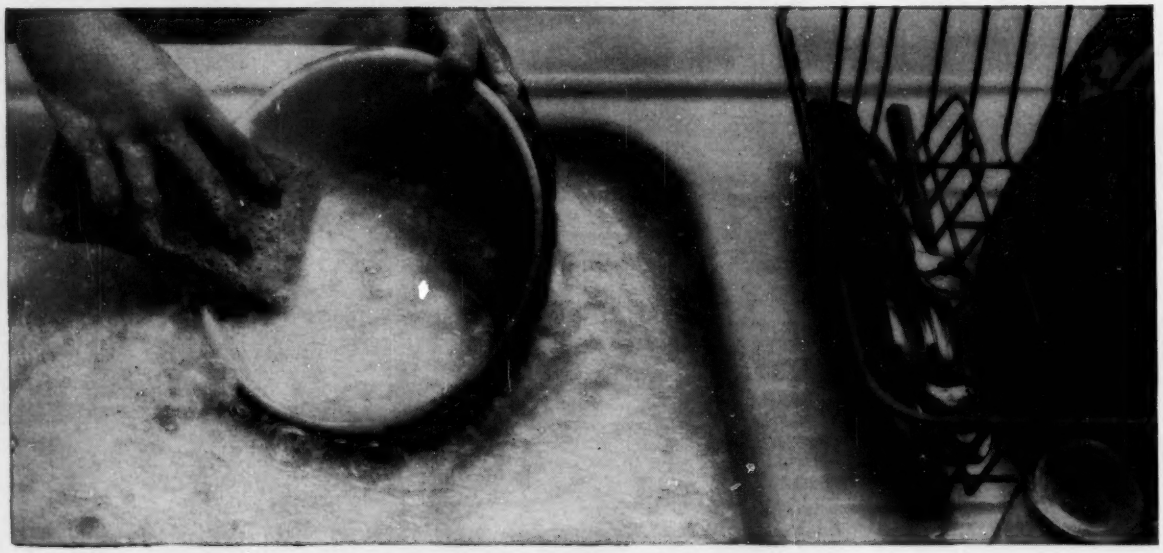


ETHYLENE for plastics



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C W Report

by Winfield McNeill

Is Your Company Ripe for Reorganization?

Here's a good recipe for slow corporate poison: Take 16 more or less fat years—the last 16, for instance. Add expansion after expansion, a few mergers, perhaps some new divisions. Top with steady sales and profit increases. Important: ignore all signs of organizational weakness.

Now read what you can do to counter the ill effects, keep your company trim and ready for quickening competition.

Through the war years of the 1940's on up to the present, the chemical industry has enjoyed an economic climate favorable to corporate growth. Earnings have steadily increased. Plant additions, expansions, new product lines and whole new companies have been tacked onto organization charts with unabated regularity.

In such an opulent climate, fundamental weakness in the ability to weather economic squalls could hardly be expected to intrude on management's attention. Chemical firms, large and small, have been too preoccupied

C W Report

with their own dynamic growth. So it's not uncommon today to find organizational infirmities within many outwardly solid companies.

But why should a chemical firm (big or small) worry much about the soundness of its organization, when business is good, the firm is growing, and most signs point to fair weather?

Many reasons figure into the answer to that question. But this is the crux: today, perhaps more so than in the last decade and a half, a sound organizational plan, animated by top-flight personnel, is vital for the company that looks forward to further growth.

Take the trenchant problem of executive and technical manpower. To attract and hold key men (or young technologists, for that matter), a chemical firm's policies, practices and reputation must be able to withstand careful scrutiny.

Prospective staffers ask: "What are the lines of advancement in this company? Is the firm a team, or does each man play his own game? Are there obstacles to initiative and creativeness? How do its employees rate this firm?

The fact is, a poorly organized company seldom attracts good men. The few it does snare leave quickly.

Aside from manpower, consider another current key issue—financing. Good dividend records and stock appreciation over the years are all the general public usually demands of a company. Banks, insurance companies, and investment houses, on the other hand, look beneath the surface—deep into company organization — before they risk substantial amounts of capital in loans or stock for expansion.

It's common for financing groups to make detailed studies of company organization and personnel before they grant loans. Their best clue to a company's future reliability is its organizational strength.

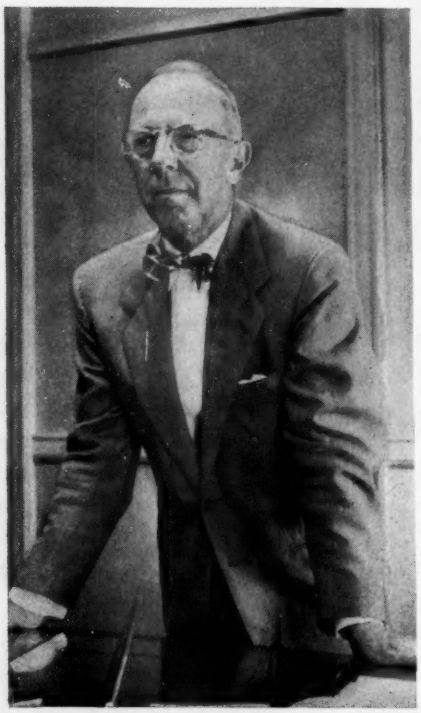
More than one chemical firm has been asked to put its house in order as a loan prerequisite. Whether a firm seeks debt financing or public financing, sound organization is a necessary attribute.

Manpower and financing are particularly important today. But strong organization is always needed to cushion the shock of such timeless business emergencies as death, transfer or resignation of key executives.

But how can a busy president or board of directors recognize the need for organizational overhaul? Potential danger signs lurk everywhere around them (*see illustration, p. 41*). The most serious:

- Continued falling off in earnings.
- Rapid turnover of personnel, especially high-level executives.
- Little success in competing for manpower.
- Difficulty in obtaining financing.
- A high proportion of "elder statesmen" holding key positions.
- Top executives who, for one reason or another, are not readily available for consultation or not sufficiently in touch with important business details.
- Dissension resulting from conflicts in authority and responsibility.
- Overworked executives who show

Meet the Author



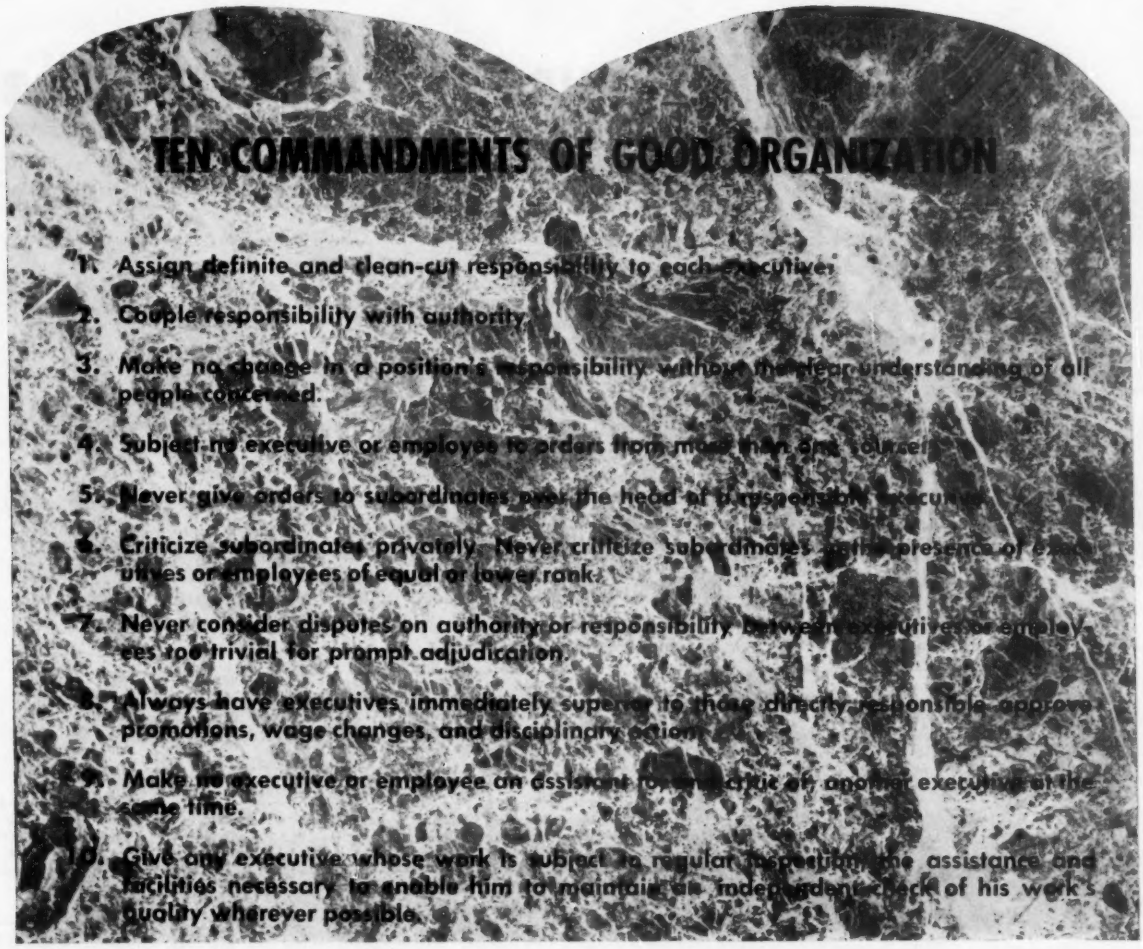
WINFIELD McNEILL is one of a growing number of retired business executives who are parlaying their experience and ability into new careers as management consultants.

McNeill's specialty—the subject of this *CW* Report—is company organization. Problems of management control and analysis of profits also claim his time as counselor to top management.

In three years of this work, McNeill has been special consultant to Arthur D. Little, Inc., and Handy Associates. Among private clients, past and present, he lists many familiar chemical, textile and manufacturing firms.

Over 30 years of his business career (after graduating from MIT in engineering administration) were spent with four firms—General Aniline & Film, Colgate-Palmolive, E. R. Squibb, and Procter & Gamble. He has held such key posts as controller vice-president, director of industrial and personnel relations, and production superintendent.

And, he's lectured (at Rutgers University Extension) on business organization, and the social aspects of business, authored numerous articles based on long experience with chemical management. This latest effort for *CW* drives home the importance of sound organization in today's business climate, tells how to recognize organizational danger signals, what to do about them.


TEN COMMANDMENTS OF GOOD ORGANIZATION
1. Assign definite and clean-cut responsibility to each executive.
2. Couple responsibility with authority.
3. Make no change in a position's responsibility without the clear understanding of all people concerned.
4. Subject no executive or employee to orders from more than one source.
5. Never give orders to subordinates over the head of a responsible executive.
6. Criticize subordinates privately. Never criticize subordinates in the presence of executives or employees of equal or lower rank.
7. Never consider disputes on authority or responsibility between executives or employees too trivial for prompt adjudication.
8. Always have executives immediately superior to those directly responsible approve promotions, wage changes, and disciplinary action.
9. Make no executive or employee an assistant to more than one executive at the same time.
10. Give any executive whose work is subject to regular inspection the assistance and facilities necessary to enable him to maintain an independent check of his work's quality wherever possible.

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the strain—too many ulcer cases or heart ailments.

• Plenty of "family" in key positions.

Often, the problem is that danger signals like these are disregarded until a crisis generates enough interest to precipitate action. Other occasions (e.g., merger with another firm) prompt organizational review by management.

Where to Begin

Assuming the need for organization is recognized, how is the job carried out? In most cases, the procedure is something like this: After selecting an individual or group to execute a study of what must be done, the president informs key staffers of what's afoot. He outlines his purpose, authorizes frank answers to questions and—if an outside consultant is involved—sanctions release of confidential information.

The man in charge of the project first obtains a chart—if there is such a thing—of the existing organization, or develops one from conversations with the president and the staff. Even at this early stage, an expert can get a good idea of how deep the reorganization must be.

Often, such a preliminary study reveals that the weak spots lie mainly in one of the company divisions or functions.

But if the preliminary study suggests that a full-fledged overhaul is needed, the investigator must dig deep into job responsibilities and authorities, fully familiarize himself with company products, markets, plants, sales operations, research, and the like.

The individual charged with these detailed studies should visit all plants, sales offices, laboratories, talk privately with every department head—but never with more than one at a time. For the sake of candor, interviewees must feel sure that all remarks will be absolutely confidential.

Such interviews are a reorganizer's main tool. They permit him to reach middle-echelon employees, who usually know much about organizational weak spots—sometimes more than executives higher up the ladder. It's up to the interviewer to recognize suggestions and criticisms prompted by self-interest, cull those of sound value to the reorganization effort.

No company employee—from directors down—should escape analysis.

After this groundwork is covered (it may take months), a preliminary report to management from the investigator details:

• Presence—or lack—of effective company policies.

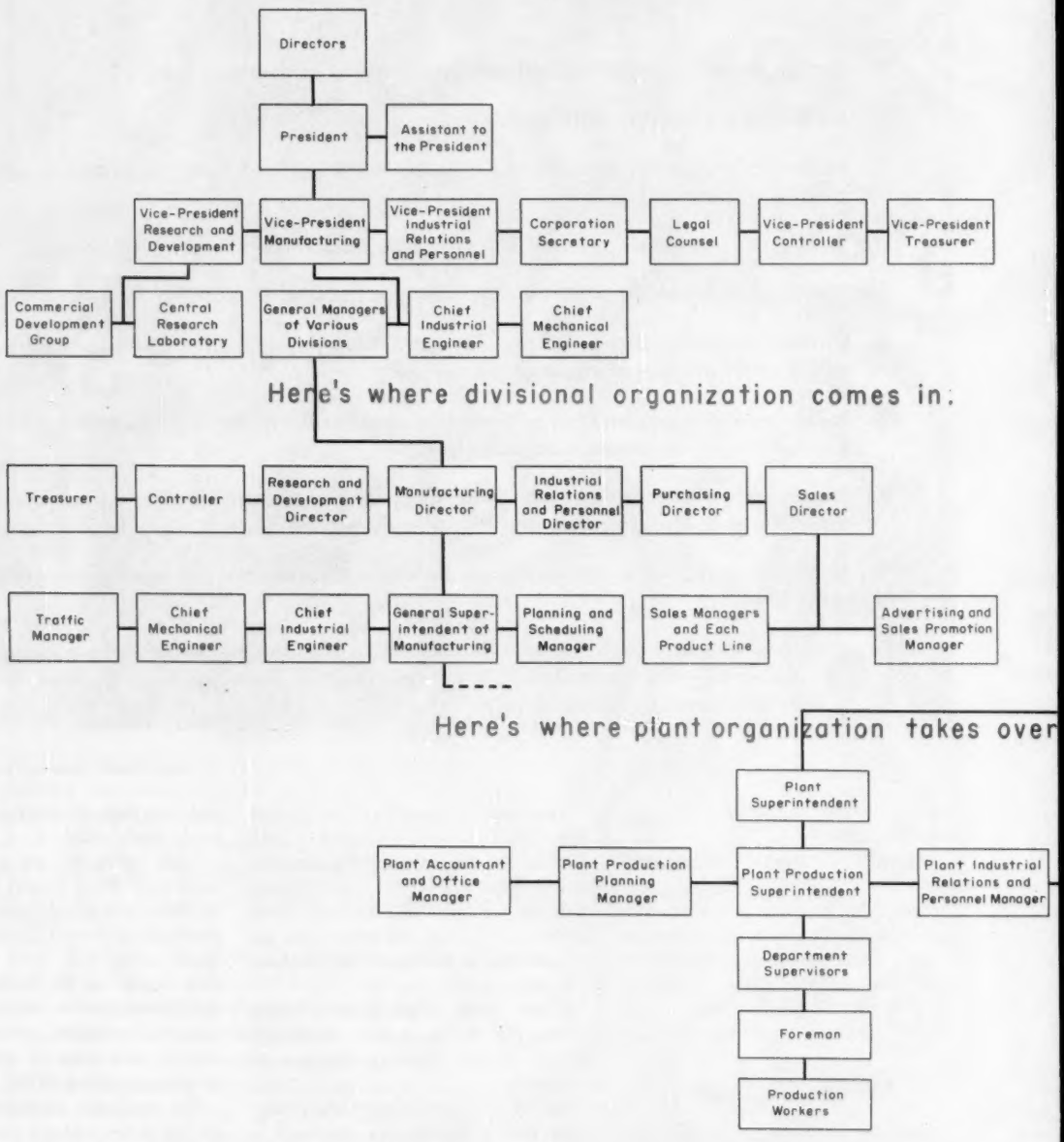
• Weaknesses in the company's structure or in lines of communication.

• Ideal organizational setup for the firm.

• Changes needed immediately and

MEASURE YOUR ORGANIZATION

. . . this model for a divisional chemical company . . . . . .



C W Report

those deferrable, to avoid undue strain on the firm during reorganization.

- Each executive's fitness for the revamped plan.
- Need, if any, for new positions.

The final report contains concrete recommendations. After a course of action is adopted, management must decide when and how to pull the stops.

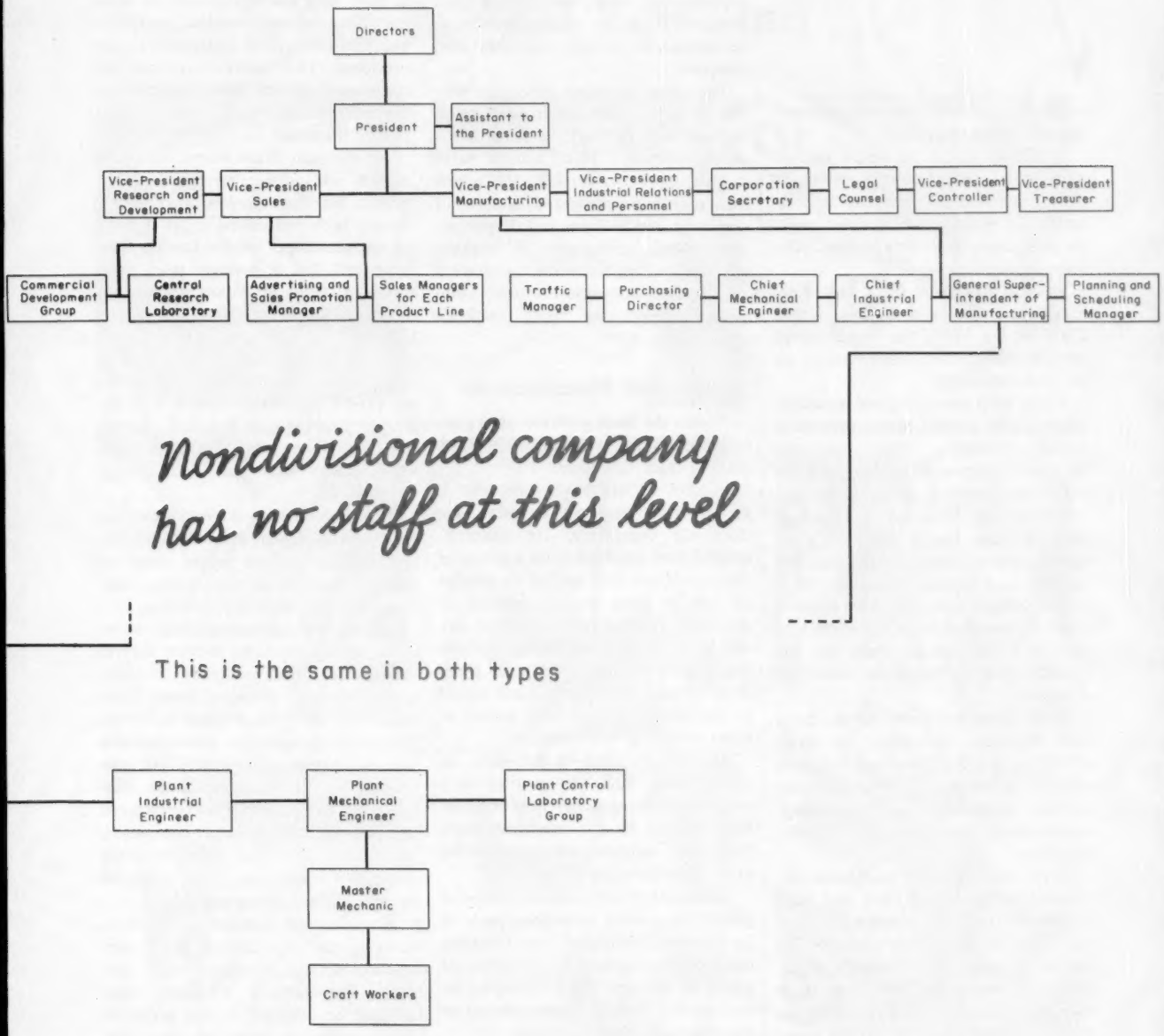
'Earthquake' or Easy Stages?

When a new chief executive is appointed, the so-called "earthquake" method usually works well. In one stroke, radical alterations and personnel changes are made.

Another reorganization approach is

CHART AGAINST...

... or this model for a nondivisional chemical company



via moderate change. Vital shifts are made immediately; others are deferred for consideration again two or three years later. A third alternative is to make key changes quickly, but shelve the less important ones until such time as retirements or deaths occur in the firm or when transfers may be diplomatically made.

The condition of the "patient" and the president's personality determine which of the methods to use. Some company heads are forced (or prefer) to reorganize with one bold stroke; others prefer the gradual method. Each case should be judged on its own merit; compromises often effect best results.

Which Organization for You?

In chemical industry today—as in most manufacturing industries—two broad patterns of organization exist (*see chart above*).

• Divisional, where entirely separate "businesses" function — sometimes

C W Report

loosely—under the company president and his home-office staff.

• Nondivisional, in which one or more plants manufacturing essentially the same kind of products operate under top management's direct aegis. In these cases, however, product sales may be divisionalized.

General Aniline & Film, U.S. Rubber, Allied Chemical & Dye, Union Carbide, Du Pont, and hundreds of other chemical companies operate on the divisional setup.

Large soap and detergent manufacturers (with several plants producing similar products, which are sold by separate sales divisions) lead the list of nondivisional chemical firms.

In the truly divisional organization, each division has a complete staff under a general manager who operates his unit as a separate company. With minor changes, a decentralized division could be divorced from the whole and sold as a unit (as Du Pont did, for example, with its reodorant chemicals division).

Some divisional firms break down their financial statements (to show profits by product lines) and maintain separate sales departments, but consolidate manufacturing, purchasing, engineering, accounting and related functions.

In all well-organized companies (divisional or not), both line and staff positions exist. Line positions receive and delegate authority from top to bottom. Example: in a manufacturing operation, authority lines flow from the manufacturing vice-president to plant superintendent (or works manager) to department supervisor to foreman to the production worker.

Staff-position executives act as top management advisors. In addition, staff positions are usually vested with functional authority over specific activities in each of the line organizations. The controller, for example, may have functional authority over accounting methods and practices in the entire company—in sales, manufacturing, research and development, and other departments.

As business conditions change, organization plans should change accordingly. To be effective, company organization must be flexible and dynamic. Also, the organization must be tailored to suit one (and only one) company.

Too often, company executives who recognize the need for reorganization in their own firm try to adopt some other company's plan. Danger lurks in this approach. Reason: the model firm may have prospered because of dominant personalities and despite organizational weaknesses. A realistic approach to reorganization is cognizant of the fact that few—if any—companies prosper by aping another's organization plan.

Consider Modifications

Within the basic patterns of organization, modifications may be made to allow greater flexibility.

Control by executive committee is an important example. In very large divisional companies, for example, control may emanate from a group of vice-presidents with special knowledge of one or more major functions or divisions. The company president usually heads such a committee; division heads (vice-presidents or even presidents of subsidiary companies) report to the executive committee instead of to an operating vice-president.

Another possible modification: in firms where new construction is a major consideration, the chief engineer may answer to the president, have functional authority over engineering in all manufacturing plants.

Still another twist: where groups of plants are spotted in various parts of the country, a divisional manufacturing manager may administer a group of plants in his area. Such managers report to the general superintendent or manufacturing vice-president.

Some firms modify the plant accountant's function by making him directly responsible to the company controller rather than to the plant superintendent or works manager. Reason: inasmuch as the plant accountant is essentially an auditor, his independence from plant control is desirable.

Historically, the treasurer's post includes accounting and financing operations. In many company organization charts, however, his job has been upgraded to that of financial vice-president, with a controller and treasurer subordinate to him. Some firms, in fact, now find it desirable to have their financial vice-president, controller and treasurer report separately to the president. The theory: a person accounting for funds should operate independently of those receiving and paying them out.

In chemical firms where sales-promotion and advertising figure prominently, the chart may be modified by having both executives report directly to the president. Sizable foreign sales may call for a foreign sales vice-president when an export corporation is absent from the over-all company scheme.

In firms with even heftier foreign operations, complete decentralization of export operations into a separate corporation (with its own full complement of officers) may be a necessary modification from tax and control standpoints.

Where purchasing is a major element of cost (as in soap manufacture), the purchasing function moves closer to the president rather than to the vice-president in charge of production.

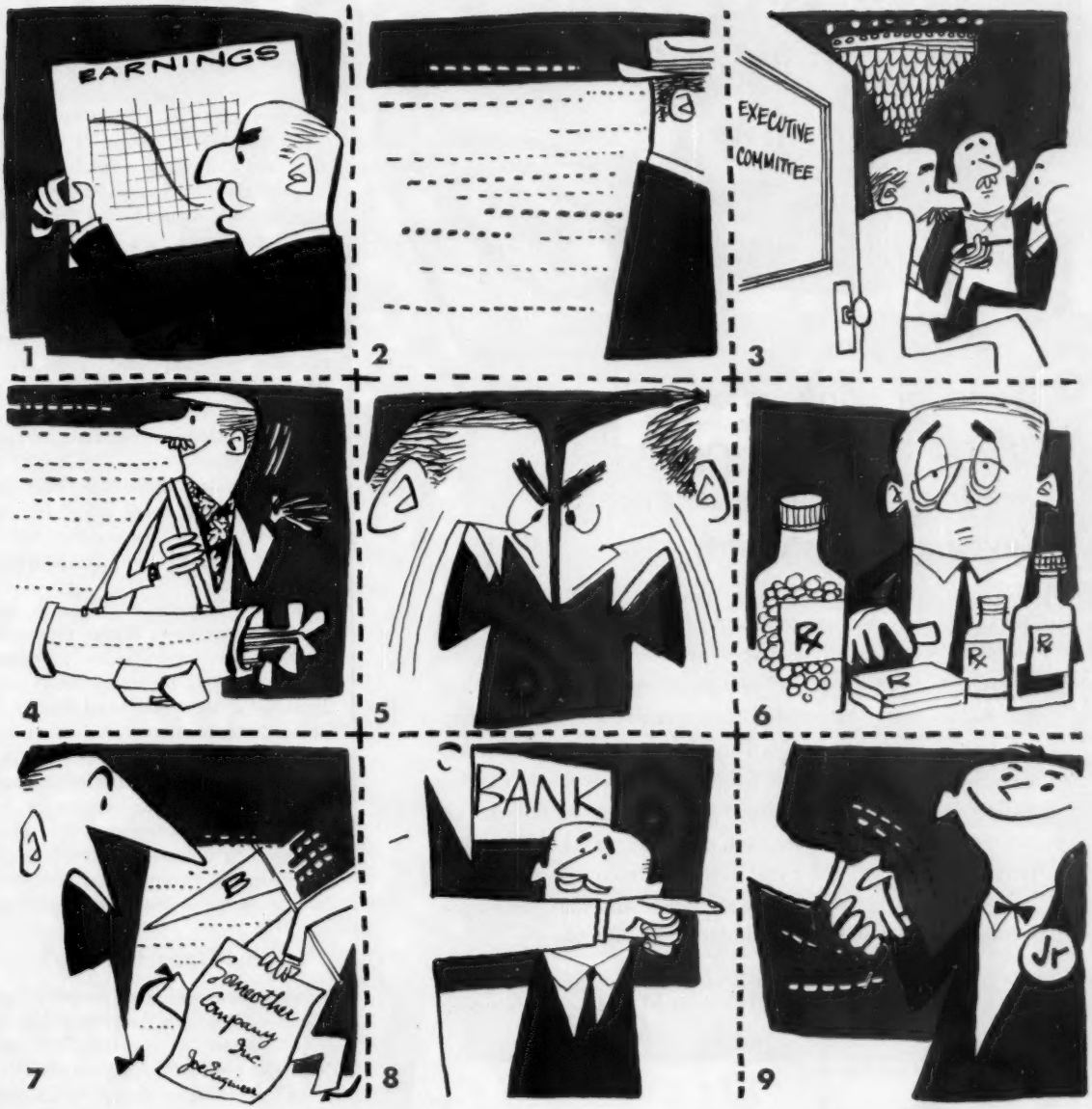
Posts such as planning officer, economist, public relations director vary in importance from company to company. In small chemical firms, these functions are part of other activities. Examples: planning is often handled by the research director; economic studies by the treasurer; public relations by the industrial and personnel relations director. In larger companies, of course, these are full-time posts under the supervision of the president or appropriate vice-presidents.

In very small companies, modifications in the organization chart consolidate several functions under one man. Example: a treasurer, legal counsel or assistant to the president could serve as corporate secretary. Such consolidations depend on the size of company and the qualifications of the executive.

Decentralization

Flexibility is the key to sound company organization in today's business climate. For that reason, decentralization of corporate functions takes on greater significance now than ever be-

Stop and Look for Organization Ills If You Find . . .



1 earnings fall off year after year

2 personnel turnover is high—especially in executive echelons

3 "elder statesmen" hold key posts at the expense of young blood

4 top executives are usually unavailable for consultation

5 conflicts in authority and responsibility continually develop

6 executives are overworked to the point of ill health

7 competition for manpower results in more failures than successes

8 financing groups shy away from lending funds or issuing stocks

9 too much "family" in key company jobs

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fore. For firms with sprawling interests —like W. R. Grace, General Electric, National Distillers and others—decentralization is mandatory.

Even though decentralization has proved its worth in such cases, it cannot be swallowed whole by all firms planning reorganization. Consider some pros and cons:

Where divisions are decentralized, executives are nearer the point of decision-making. To a great extent, this permits better utilization of executive time and ability. As a result, decision quality may be improved; operating expenses are reduced; and opportunities for growth are more quickly recognized and effected.

Decentralization also brings advantages to the community and individual. With decentralization, communities are peppered with many diverse industries. Negative effects of overconcentration of one industry in one area (Detroit and automobiles) are avoided.

What's more, individuals gain the "small company, small town" feeling, which is usually lost in the highly centralized organization headquartered in large cities.

On the other side of the fence, decentralization can bring problems. There's more opportunity for conflicting decisions by headquarters and divisional management. And decentralized management may fail to utilize specialized talents available at the home office. Sometimes decentralized management stumbles because of its weakness. Top management also may be unwilling to delegate complete responsibility to decentralized groups—another source of conflicting decisions.

Who Does the Job?

The still-unanswered question, of course, is: Who gets the reorganization project? These are the usual alternatives: the president delegates the job to an individual or group within the firm; or an outside consultant is retained.

Which course is best depends largely on the answers to the following questions:

1. Is there anyone in the firm with the time and know-how for this job?

2. Can such an executive be objective in his recommendations without

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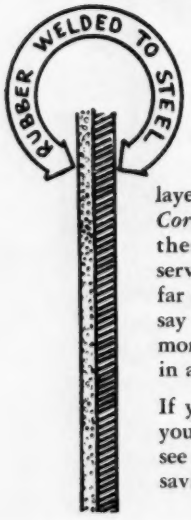

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CW Report (continued)

jeopardizing his career with the company?

3. Will this executive get the help and cooperation of all personnel involved in the project?

4. To be acceptable, must the study bear the prestige of a consultant?

5. Would a company-prepared organization report be acceptable to outside interests (banks, Wall Street, etc.)?

6. How does company personnel feel about an intramural study vs. outside study?

Many chemical organizational studies can be, and have been, developed by competent company executives. This is generally true in large firms that employ many specialized people. Even big outfits, on the other hand, often call on consultants or management experts to pilot them through reorganization—from the basic evaluation to the final step.

If management decides to use an outside agency, it should take certain precautions. Bids should be invited from a number of firms that have good reputations for corporate reorganization work. Executives of the company desiring the checkup should carefully investigate the qualifications and background of the men to be assigned to the job. This must be done with as much care as is expended in hiring a top executive. Finally, double checks should be made of similar work done for others.

It involves painstaking effort, but the result should be worth it. Armed with a realistic organization chart, the right management, a sound philosophy of organization and carefully conceived executive job descriptions, a company is well-prepared to face the demands of quickening chemical competition.

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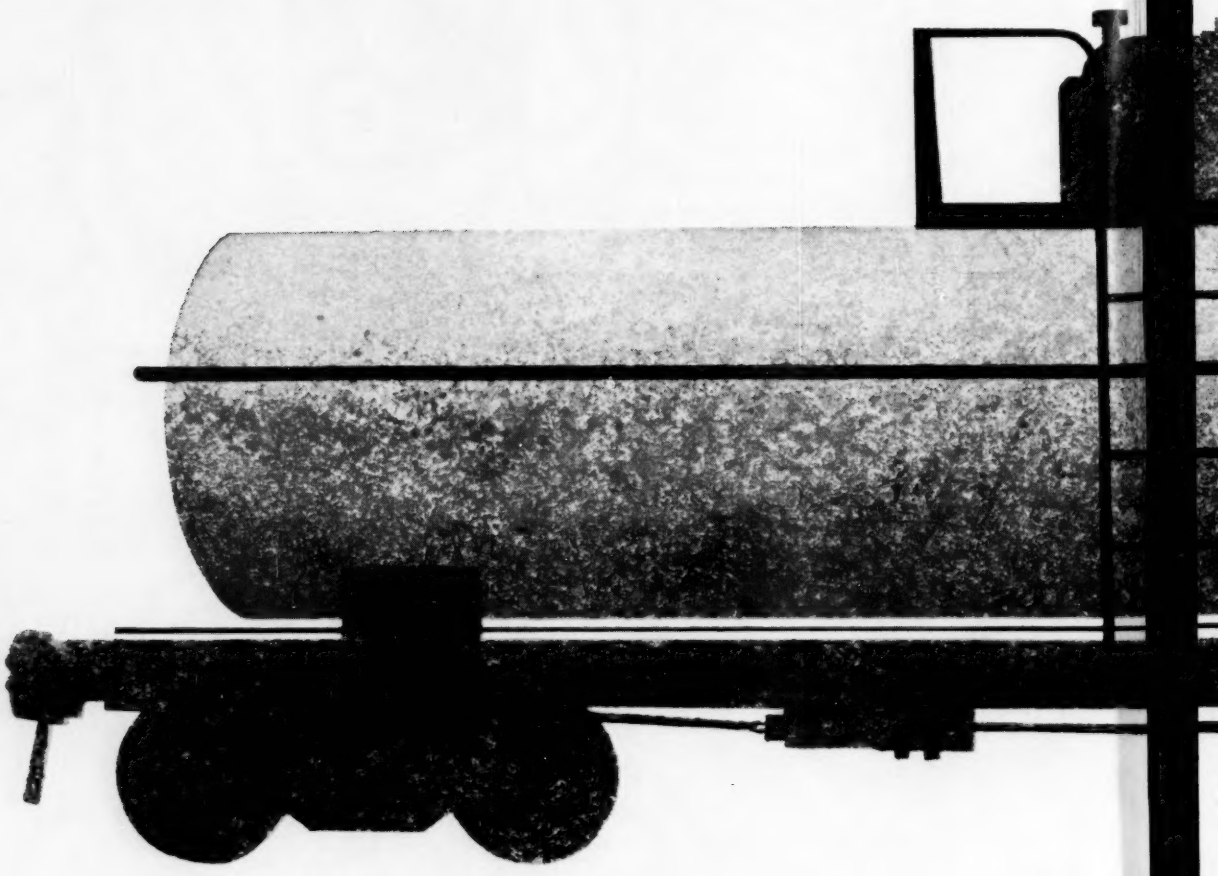

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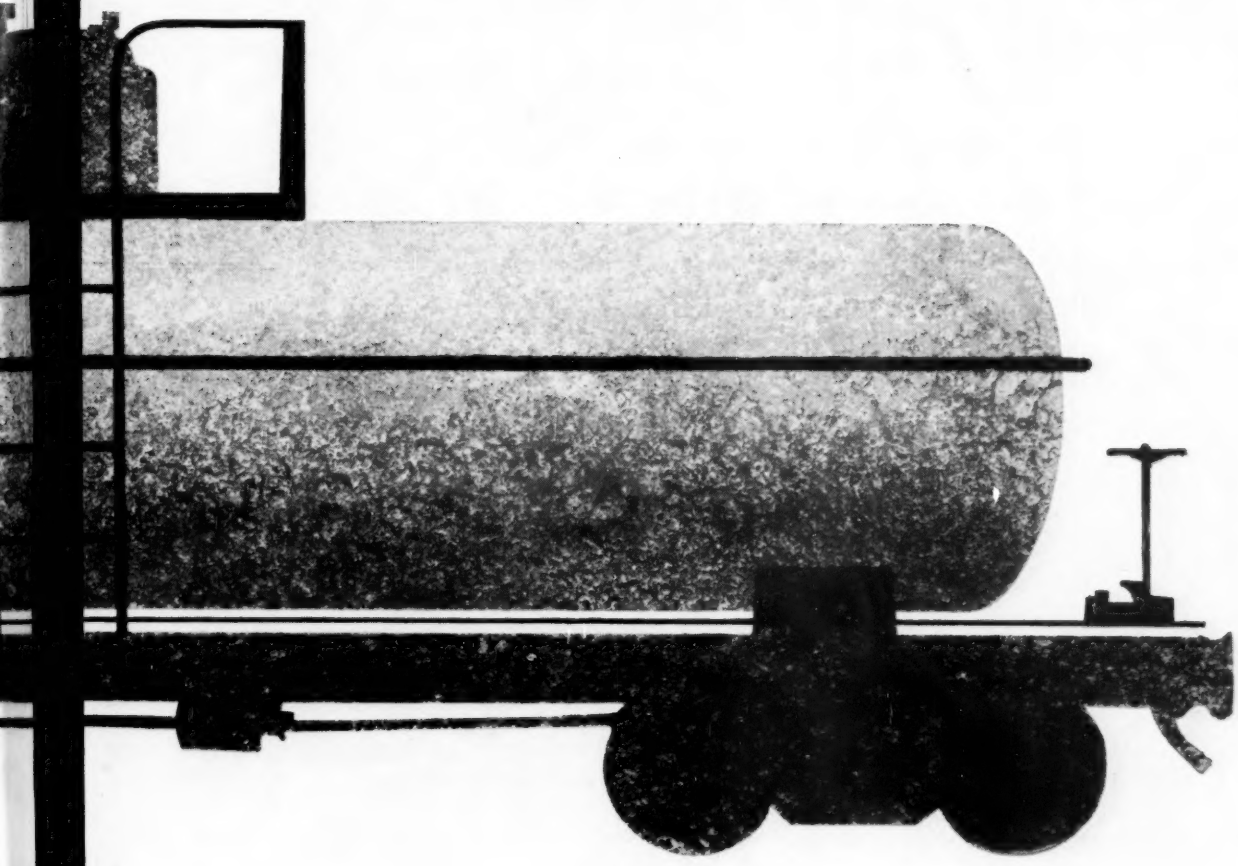

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U.S.I. CHEMICAL NEWS

August 25 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1956

U.S.I. TO PRODUCE ZIRCONIUM SPONGE; A.E.C. TO TAKE MILLION LBS. PER YEAR

Sodium Reduction Process to Be Used for Zirconium Manufacture—Yields Purer Product at Much Lower Cost

A 1,500,000 pound-per-year plant for the manufacture of reactor-grade zirconium sponge is being constructed by U.S.I. at Ashtabula, Ohio, site of the company's sodium and chlorine production facilities. Both of these raw materials will be used in the process when the installation goes onstream in mid-1957.

One million pounds per year for a five year period have already been committed to the Atomic Energy Commission according to a contract signed in May, 1956. This was the largest single contract awarded by the A.E.C. in its zirconium procurement program.

Essential in Atom Program

Reactor-grade zirconium is essential as structural material for atomic reactors and for cladding uranium, because of its low nuclear cross-section. This ability to let neutrons pass through increases the fuel efficiency of the reactor. Zirconium also has extremely high corrosion and heat resistance vital in atomic energy applications. Hafnium, always found in association with zirconium in the natural state, must be removed in an extra refining step in the manufacture of reactor-grade material, because of its neutron-trapping qualities, although the hafnium does not interfere with zirconium's corrosion resistance.

Important to Chemical Industry

The commercial grade, with 1-3% hafnium content, is expected to be used extensively by the chemical process industries. It has excellent resistance to acids, alkalis, corrosion and heat, combined with strength, ductility, light weight and good machining properties. It is hoped that U.S.I.'s new process can eventually bring the price of commercial grade zirconium sponge down to about $3.50 per pound, which is expected to result in finished fabricated zirconium parts priced at about $15 per pound. At this price it will be competitive with other high-quality materials of construction.

Zirconium has been used for many years to fabricate the spinnerettes employed in

MORE

Zirconium sponge made at U.S.I. pilot plant, flanked by 2 zirconium test rods.

U.S.I. Semi-Works Metals Plant at Ashtabula Is Under Construction

A half million pound-per-year semi-commercial metals plant is being built by U.S.I. at Ashtabula, adjacent to the site of the projected full-scale zirconium unit, and will be completed by September of this year. It will be used for production of zirconium sponge during construction of the larger installation.

Titanium, hafnium, thorium, beryllium and other metals can probably be made in this plant by the same basic U.S.I. process. The new plant will serve as proving ground for production of these metals when, and if, full-scale production is planned.

Recovery Process Developed

A U.S.I. process for recovering reactor-grade zirconium from hafnium-free scrap will undergo large-scale trial runs for the first time at the new unit. Already successful in the laboratory, this recovery process is expected to convert zirconium scrap into sponge on a toll arrangement for about half the cost of virgin sponge. This development is an important one, since only 30% of all zirconium purchased for fabrication is converted into the final structures or parts. Losses during metallurgical and production steps account for the other 70%.

Minimum Standards Being Set for Plastic Pipe

The National Sanitation Foundation has recently announced the establishment of minimum standards for plastic pipe used to carry drinking water. With the cooperation of the Society of the Plastics Industry, an identification program has been set up whereby participating companies use an NSF seal on their pipes and fittings when they meet standards. Manufacturers of the plastic raw materials must also have an NSF OK, and U.S.I.'s PETROTHENE® polyethylene resins have already received this approval.

This move is a step toward standardization of plastic pipe for all purposes. Polytheylene pipe is being used more and more, particularly in the chemical process industries, in applications where the conditions require that the best grade of pipe must be used. Purchasers should be sure they are getting pipe made of 100% virgin material, which will withstand the conditions of use.

U.S.I. can supply on request the names of pipe producers who maintain high quality standards in the manufacture of polyethylene pipe.

Nitrofurans Used as Chemotherapeutic Agents

U.S.I. Diethyl Carbonate Used in Synthesis

Another group of compounds has joined the sulfa drugs and the antibiotics in the fight against infection. This is the nitrofuran group of products, derived from furfural which has had a nitro-group added in the number five position on the ring, and which has been further modified by chemical reaction.

These products have the rare property of remaining effective against bacteria and fungi where resistant strains have been built up against the sulfas and antibiotics. Thus the medical man has a reserve weapon to draw upon when and if other agents begin to lose their effectiveness.

Hundreds of nitrofuran derivatives have been synthesized since 1944, and of these, five have proven effective enough for development into commercially usable antimicrobials:

nitrofurazone for controlling infected wounds, burns, ulcers and other skin lesions; infections of the eye, ear, nose and other mucous membranes; bladder infections; and diseases of cattle and poultry.

nitrofurantoin for treating bacterial infections of the urinary tract.

nitrofurfuryl methyl ether for fungi, spores and bacteria which attack the body.

furazolidone for treating some types of vaginal infections, and diseases in poultry. The U.S.I. product diethyl carbonate is used in the synthesis of this material.

A fifth derivative is now almost ready for marketing.

The work of synthesizing and testing new derivatives continues, but investigators are no longer proceeding haphazardly. Years of experiment have shown researchers how various nitrofurans interfere with the multiplication of bacteria in the body, and how these nitrofurans are dispositioned by the body. This information permits the synthesis of derivatives specially designed for specific body infections. As a matter of fact, nitrofurantoin, specific against urinary tract infections, was created in this way.

Other members of this group show anesthetic properties. Some are antihistaminic, and some affect certain types of cancer cells. So far, all exhibit a minimum toxic effect.

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August 25 ★ **U.S.I. CHEMICAL NEWS** ★ 1956

CONTINUED

Zirconium

viscose rayon manufacture because of its resistance to the alkaline xanthate solution on one side and sulfuric acid on the other. Some other applications include:

- "Getters" in radio tubes. A "getter" is a small piece of metal enclosed in a vacuum tube which combines with any gases remaining to take them out of circulation. Zirconium has high affinity for gases, extends the life and efficiency of tubes.
- Desulfurizing, deoxidizing and anti-aging agent for steel. This use is also based on the metal's affinity for gases.
- Alloy for magnesium and gold.
- Powder metallurgy.

Sodium Process Employed

The new plant will be the first to make zirconium sponge employing semi-continuous production techniques developed by U.S.I. research men in the company's own laboratories. These techniques involve the use of sodium as the reducing agent for zirconium tetrachloride, and yield a zirconium sponge of greater purity as a result.

Zirconium sources are abundant, and the metal has been known and used for many years in its impure form. But production of a pure, ductile metal has presented many technical difficulties. Only in recent years, first with magnesium and now with U.S.I.'s sodium reduction process, have the problems of refining the metal been licked.

New Process Lowers Costs

The method, which can probably also be applied to other metals such as titanium, thorium, beryllium and hafnium, has the advantage over conventional processes of a lower initial investment cost. It is expected to bring the market price of reactor-grade zirconium sponge from the new plant down to less than half of the current price of about $15.00 per pound and to have the same effect on the price of the commercial grade. U.S.I. feels that the lower price plus greater availability will increase applications for the metal substantially. Therefore, the forthcoming plant has been designed for easy and rapid expansion.

Hansa Yellow G Pigment Now in Flushed Form

Produced From Acetoacetanilide

A flushed Hansa Yellow G pigment in paste form is being offered to the protective coatings industry for the first time, for use in finishes where high brilliance, good lightfastness and resistance to alkalis are desired.

This organic azo pigment is produced by coupling *m*-nitro-*p*-toluidine and acetoacetanilide. It is transferred from the water to the oil phase through pigment flushing in a medium-short glycerol phthalate soya-modified alkyd resin, and reduced with mineral spirits.

Improved Method Found For Administering Urethan In Treatment of Leukemia

A new method of administering urethan (ethyl carbamate) has substantially reduced undesirable side effects which previously limited urethan's use in treating several types of leukemia.

Urethan administered rectally by means of suppositories was found to give the same therapeutic response as that obtained by oral and intravenous treatment. Such adverse after-effects as anorexia, vomiting, nausea and diarrhea were eliminated in most cases.

Electromet Titanium Plant Now Operating At Ashtabula, Ohio

The largest titanium plant in the world, built by the Electromet Division of Union Carbide and Carbon Corporation at Ashtabula, Ohio, went on stream in April 1956.

Metallic sodium acts as the reducing agent for titanium tetrachloride in the process, and is supplied from the U.S.I. sodium plant nearby.

TECHNICAL DEVELOPMENTS

Chemical resistance of polyethylenes, both conventional and low-pressure, and polyvinyl chlorides to about 400 reagents is shown in chart now being offered by plastics processor. **No. 1160**

A new liquid rubber corrosion-resistant coating can be brushed or sprayed onto all types of surfaces. Said to adhere well, shows excellent toughness, flexibility and abrasion resistance. Claimed to be waterproof, to protect against oil, chemicals, fungi, sunlight. **No. 1161**

A pepper-like bite in foods, lozenges, toothpastes and mouth washes can be provided synthetically by beta-cinnamylidene acetoyl piperidide at 1% of the concentration required for natural pepper. May aid carbohydrate digestion. **No. 1162**

Nine new adhesives for modern plastic packages have been developed by one company, both for forming the packages themselves and for labeling. These liquids are custom-made to bond to particular plastics in particular applications. **No. 1163**

Manual on electrically-conductive coatings is available which covers their use in research, development and design in fields such an automation, aircraft, electronics and geology. **No. 1164**

A new pigment for plastics, rubber and printing inks is reputed to have excellent permanence and resistance to heat discoloration. It is a brilliant maroon, non-bleeding, easily dispersed organic pigment. **No. 1165**

Plastic fittings of advanced design for polyethylene pipe are claimed to eliminate leakage problems by featuring secondary serrations beneath the clamp compression area to assure "bite" with the pipe. A hex hub for wrench tightening prevents damage to fitting. **No. 1166**

A new hand cleaner has been designed to remove oil, dirt, tar, pitch, dye, ink, paint or just plain heavy grime rapidly and thoroughly, according to producer. Claimed to give no skin reactions, leaves hands soft. **No. 1167**

The first dermatological cream containing prednisolone, a highly potent anti-inflammatory steroid, is now on the market. Claimed to relieve itching and pain of many allergies and eczemas, shows no systemic absorption. **No. 1168**

New dust mask to protect workers against nontoxic dusts is said to be light, comfortable, easy to breathe through. Polyethylene frames give strength and flexibility. Latex filter protects against particles down to one micron. **No. 1169**

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Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.
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Caustic Soda: 50% liquid, in tank cars.
Sodium Peroxide: dust-free granules, in drums.
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Ammonia: Anhydrous, commercial and refrigeration. Tank cars or tank wagons. Also Nitrogen Fertilizer Solutions.

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Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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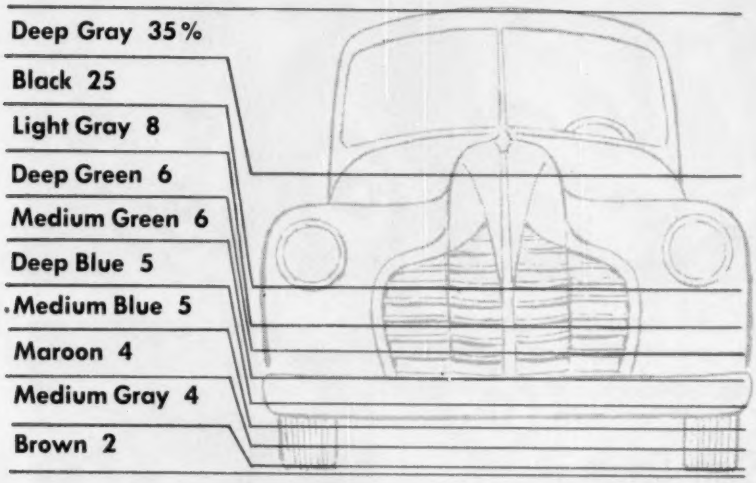
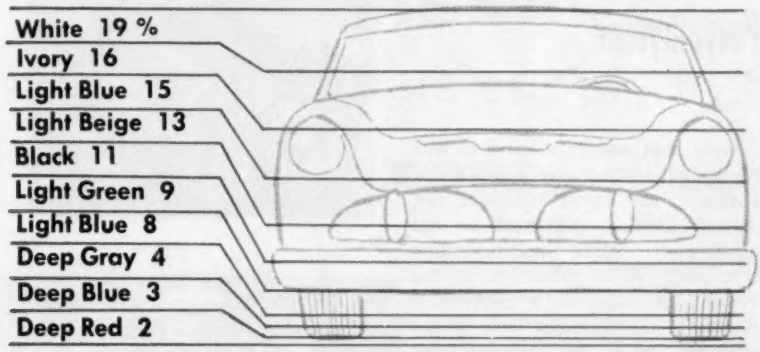
In 1941, auto colors were mainly dark shades.

Here's the color breakdown of a typical model produced in that year:



But today, most auto colors are in the light range.

Here's the breakdown on a typical 1955 model:



Source: Newell P. Beckwith, Rinshed-Mason Company of Canada, Ltd.

CLUES FOR COLOR SEEKERS

Changes in auto color fashions are sparking the search for light-fast, brilliant-hued pigments. The following are becoming the pigments of choice in the auto paint field, giving researchers their best clues for further exploration:

- **VIOLET**
  - Halogenated Thio Indigos
  - Halogenated Iso Violanthrones
  - Carbazole Dioxazines
- **BLUE**
  - Halogenated Indanthrones
  - Phthalocyanines
- **GREEN**
  - Dibenzanthrones
  - Phthalocyanines
- **YELLOW**
  - Flavanthrones
  - Anthrimide Browns
- **ORANGE**
  - Di Brom Pyranthrones
  - Halogenated Anthanthrones
  - Tri Brom Pyranthrones
- **RED**
  - Perylenes
  - Acridones
  - Oxazoles
  - Substituted Thio Indigos

Pastel Demand Spurs Research

The figures above are statistical evidence of a trend that's been apparent for some time to even a casual Sunday motorist. Automobile buyers prefer pastels. What's more, this same preference for the lighter hues is being voiced by home buyers, even painters of chemical process plants (*CW, July 28, p. 28*).

That, in essence, is why researchers are starting a big push for tougher pastels. They're looking for pigments that have improved light-fastness, tinctorial strength, brilliance.

And take it from Vincent Vesce, technical director of Harmon Color: any researcher who's overlooking some of the old stand-by textile dyes is missing a good bet. Vesce has screened hundreds of pastel pigments, has turned up nine types that are already catching on in automotive finishes. More important, his list (*right*) is an orderly, logical breakdown of promising pastel pigments that may serve as a guide-line for other pigment research.

The select group meets these criteria:

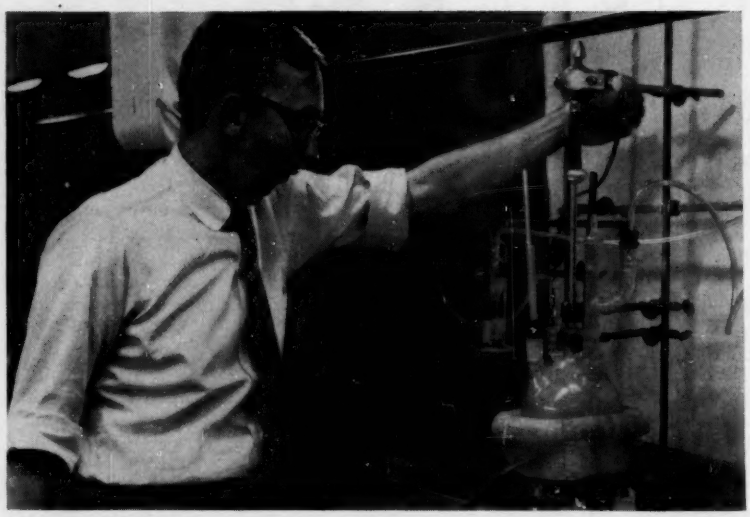
- They produce novel shades when used as metallics (with aluminum) or with small amount of white.
- Many have excellent light-fastness in tints extended with white in ratios of up to 50 to 1.
- In blends with new molybdate oranges, some provide a new series of durable, vivid shades. This extends the range formerly obtained with only the cadmium pigments.
- They possess good working and handling properties—i.e., they resist bleeding, withstand high temperatures and maintain package stability.

But with all these attributes, the group still isn't finding fast acceptance in certain uses, chiefly because of their high price. At $5.50/lb. for lakes, up to $32/lb. for toners (pure pigment), they're up against house paint pigments that sell for $1-2/lb. But Vesce doesn't foresee a price drop.

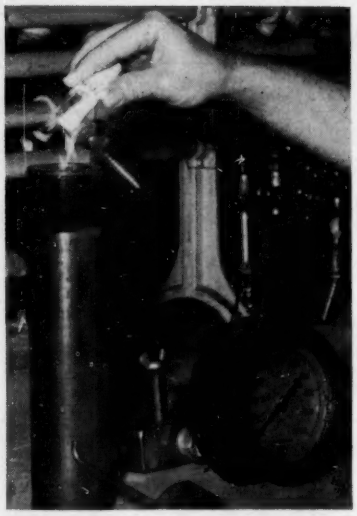
High performance, he hopes, will make up for the higher price. Vesce, who recently finished one-year exposure tests on house paints made with the selected pigments, reports the samples show "practically no fading."

Meanwhile, although the shade range for certain pigment colors is at least temporarily adequate, there's a need for other shades—particularly a brighter red-magenta and a lighter, cleaner yellow. If the public's avidity for bright hues continues, it's a good bet that research will turn up even these so-far unattainable pigments.

HARMON'S VESCE: For old textile dyes, a bright new pigment future.



HYDRIDES' WADE: With pressure (right) or without, his catalyst cuts hazards, offers a . . .



Short Cut to Low-Pressure Polyethylene

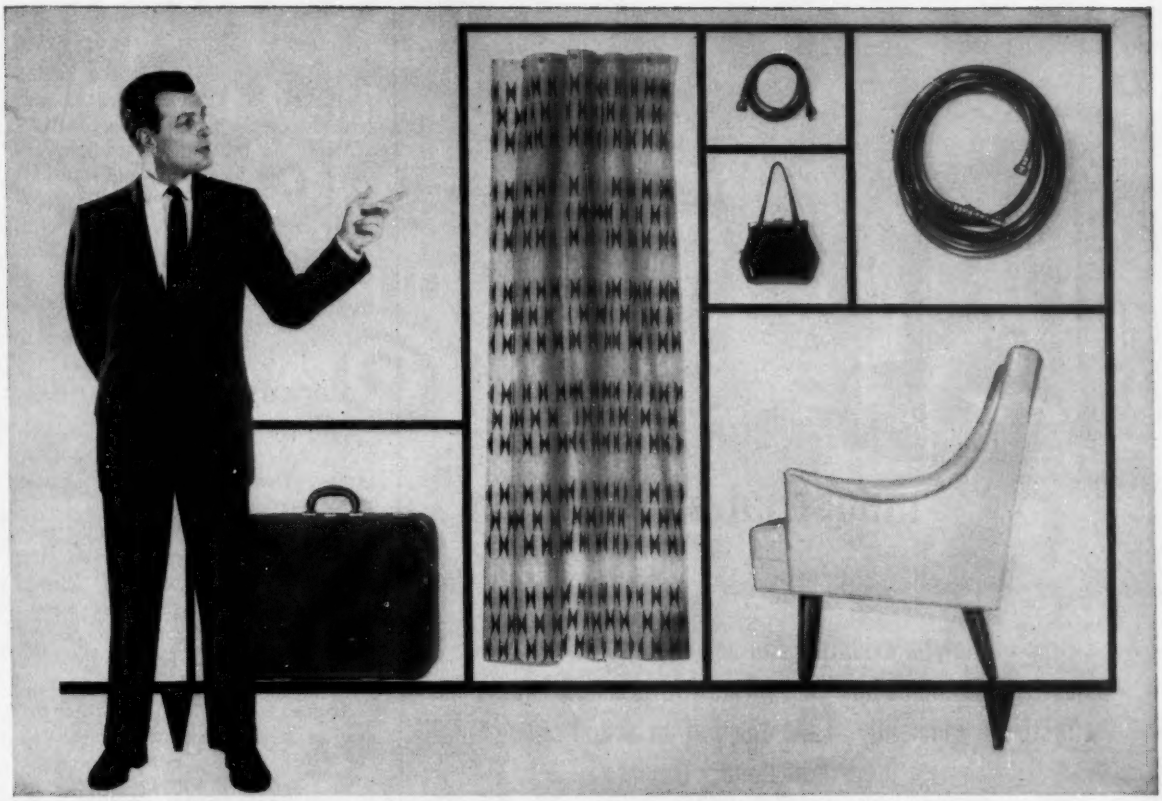
More than one chemical firm with a stake in low-pressure polyethylene is feeling out Metal Hydrides Inc. (Beverly, Mass.) this week on the latter's new olefin polymerization technique.* Main attraction is the process's potential as a cost-cutter. Briefly, Metal Hydrides says it has developed an *in situ* catalysis that eliminates the need for making and handling the highly flammable and costly ($25/lb.) aluminum trialkyls—which are necessary with present, so-called Ziegler catalysis.

The new technique takes two forms—depending on whether the ethylene is to be polymerized at low or moderate pressures. At one or a few (preferred) atmospheres, it calls for reaction of sodium hydride dispersed in oil, aluminum chloride and titanium tetrachloride plus an inert diluent (e.g., mineral oil) in a polymerization vessel at 100 C. In the presence of a small amount of ethylene, the catalyst is formed and polymerization is initiated. More ethylene is added, and "highly crystalline" Ziegler-type polyethylenes are formed. These are in the 40,000 to more than 200,000 molecular-weight range.

At higher temperatures and pressures (500 psig.), no aluminum chloride is necessary, according to Metal Hydrides. Sodium - hydride - reduced titanium halides are sufficient to catalyze the polymerization, which results in an end-product identical with the low-pressure polyethylene.

Key to both processes (on which

*Disclosed recently by Robert Wade, assistant director of Metal Hydrides' chemical research laboratories, at a Massachusetts Institute of Technology summer course on "Recent Advances in Catalytic Polymerization."



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• ***Good compatibility with vinyl chloride resins*** • ***Good stability*** • ***Reduced volatility*** • ***Low temperature flexibility*** • ***Resistance to extraction by oil and water***

Plasticizers made from 2-Ethylhexanol include di-2-ethylhexyl phthalate, di-2-ethylhexyl tetrahydrophthalate, di-2-ethylhexyl adipate, di-2-ethylhexyl sebacate, di-2-ethylhexyl azelate, mixed esters of 2-ethylhexanol, and phosphate plasticizers based on 2-ethylhexanol.

CARBIDE'S 2-Ethylhexanol is also used as a defoaming, wetting, and dispersing agent; solvent for gums, resins, and waxes; and as an intermediate for surface active agents.

These and other profitable applications are discussed in our "Alcohols" booklet. Write today for your copy. Address—Carbide and Carbon Chemicals Company, Room 308, Dept. H, 30 East 42nd Street, New York 17, New York.

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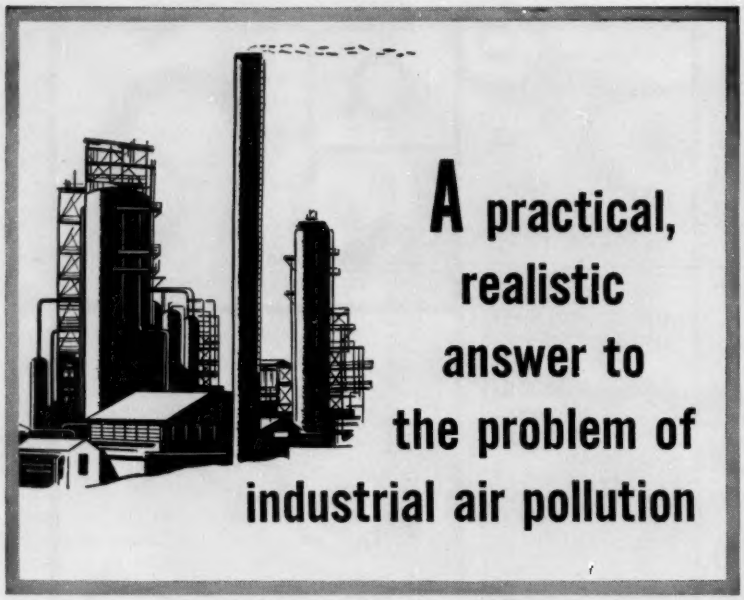

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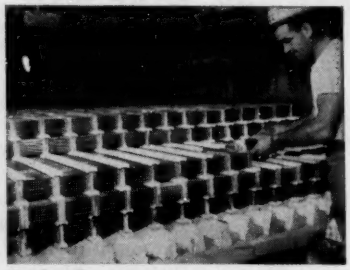

Houdry Oxycats being installed in a waste heat boiler at a Sun Oil Co. catalytic cracking unit at Marcus Hook, Pa. This Oxycat installation and a similar one at Toledo save Sun Oil $400,000 a year by oxidizing waste gases to generate 100,000 lb. of process steam an hour.

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patent applications have been made) is the use of finely divided sodium hydride. Ziegler's pioneering effort reportedly used ball-milled sodium hydride, which does not, Metal Hydrides avers, have the same catalytic properties as its newly developed, highly dispersed form. At any rate, the firm feels its fledgling, laboratory-scale catalysis is novel and could be headed for commercial career.

Integrity Is the Guide

Civilian scientists employed on non-secret federal research projects will be judged on the basis of their professional integrity.

This new White House policy puts government hiring practices in line with those of the National Science Foundation, means that the government will not deny grants or contracts to researchers solely because they are charged with being a security risk.

According to an NSF estimate, the new directive will affect about 12,000 university scientists now working on federal grants. It follows last April's recommendations by the Committee on Loyalty in Relation to Government Support. The seven-man committee—headed by J. A. Stratton, vice-president and provost of Massachusetts Institute of Technology—turned up these conclusions from a security study made at the request of the Administration.

"Unclassified research by its very nature . . . requires no secrecy, but thrives on the dissemination of new knowledge . . . [therefore] the test in the award of grants and contracts for unclassified research should be scientific integrity and competence of the individuals responsible."

But the committee noted that "the government should no more ignore criminal disloyalty in a scientist than in any other citizen," asked that if the disloyalty allegation is "sufficiently serious," formal charges and an "open hearing" be required.

In a letter to Detlev Bronk, president of the National Academy of Sciences, the White House disclosed that government agencies would follow the committee's recommendations, also said the Administration "recognizes that an atmosphere of free inquiry and protection of individual rights are prerequisite to sound scientific progress."

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RESEARCH

PRODUCTS

Taintless Solvent: A new, high-purity grade of dioxane is available from Fisher Scientific Co. (Pittsburgh). Intended for use in chemical analyses where low iron and low peroxide are desirable, it features a typical analysis of 0.025% water, 0.003% peroxides, 0.004% carbonyls, and 0.0001% iron and heavy metals.

•

Weight Reducer: Geigy Pharmaceuticals (Ardsley, N.Y.) is out with a new compound reported to produce steady, progressive weight loss in patients while causing a minimum of undesirable side effects on the cardiovascular and central nervous systems. Chemically 2-phenyl-3-methyl-tetrahydro-1, 4-oxazine hydrochloride, it's tradenamed Preludin.

•

Casein: A biologically stable casein that resists microbial spoilage and insect infestation is now available from Borden Co.'s Chemical Division (New York). Made with a built-in preservative that reportedly cannot be leached out or extracted by an emulsified oil phase, the new product is said to be more soluble in water with alkalis than ordinary casein.

•

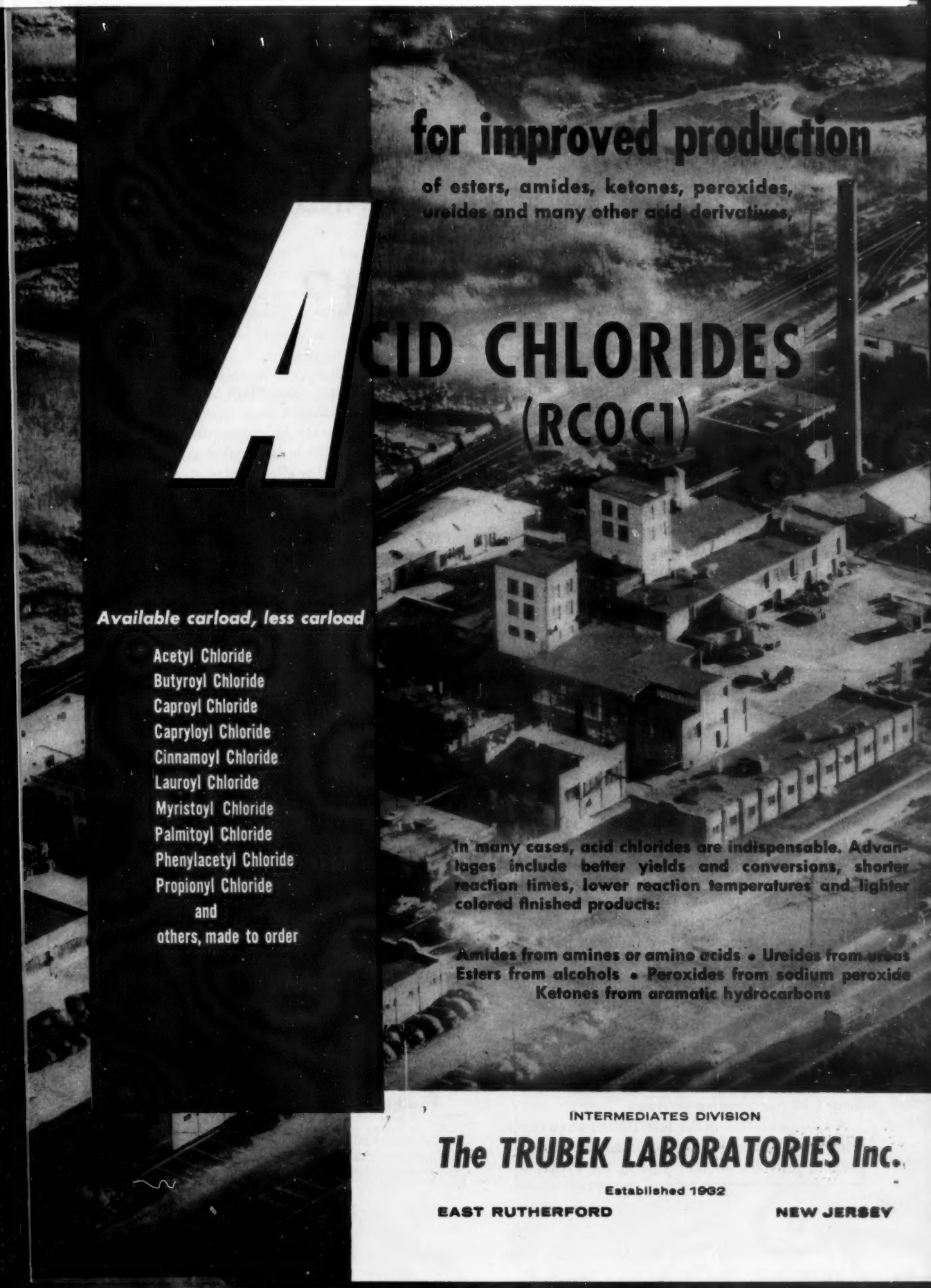
Wetter: A new sulfonate-type anionic surfactant featuring high solubility, stability, surface activity in strong electrolyte solutions is available from Dow Chemical Co. Called Dowfax 2A1, it's for metal, household, industrial hard-surface cleaning, can also be used as a detergent or wetting agent in the textile, leather, petroleum, paper industries.

•

Feed Supplement: Monsanto's organic chemicals division now offers feed-grade glycine for evaluation as a commercial chicken feed supplement. Use of glycine has reportedly boosted chicken growth in recent lab tests.

•

Intermediate: Evans Chemetics, Inc. (New York) is out with a new intermediate — 2-diethylaminoethanethiol hydrochloride—that reportedly facilitates preparation of the thio analog of diethylaminoethanol derivatives. It can also be used in preparing phosphorus-containing pesticides, as a catalyst for polymerizations involving conjugated diols. Price range: less than 1 lb., $20/lb.; 100 lbs., $7.10/lb.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THE SHORTAGE OF SCIENTISTS AND ENGINEERS:

What Caused It?

WHY is the United States confronted with a serious shortage of scientists and engineers?

One reason, discussed in earlier editorials in this series, is that the increasingly complex technology needed for national security and for an expanding economy has raised enormously the demand for technically trained people.

But it is clear also that too little has been done to increase the supply of scientists and engineers and to make most effective use of the limited number now available. It is with this second reason for the shortage that this editorial deals.

Too few bright young people have been attracted to careers in the sciences and engineering. Many with technical training have been leaving these professions, with the exodus from teaching being especially alarming. And the technical talent now employed in industry, government and education is, in too many instances, being utilized less effectively than it might be.

Paying for a Miscalculation

A legacy of the depression provides part of the explanation for the current shortage of young people entering scientific and engineering careers. Because of low birthrates in the 1930s, there are now about one million fewer boys and girls of college age than there were in the early 1940s. Not until 1960 will there be as many in the 18-21 age group as in 1945. And from the brightest young people of these ages must come, not only scientists and engineers, but the new members of all the professions needed by our growing economy.

A miscalculation in the late 1940s, when our future needs in various occupations were being gauged, provides another part of the explanation. Occupational counselors and high school students were advised that, because of heavy postwar enrollments in engineering and other technical fields, "it is likely that the shortages of trained men will be alleviated in a few years."*

Instead of being alleviated, however, the shortages became more acute. Job opportunities grew rapidly, while graduating classes dwindled. Fewer than half as many students received degrees in engineering in 1955 as in 1950, the peak postwar year. The trend has been reversed, but graduating classes will not be large enough to narrow the gap for several years.

Lost Talent

Beyond these temporary conditions, there is another explanation for the failure of the number of scientists and engineers to keep pace with our rising needs. This is the staggering loss between high school and college of young people with the talent to be successful in science and engineering. **Last year between 60,000 and 100,000 high school graduates of college ability failed to enroll in college for financial reasons and perhaps an additional 100,000 did not enter college because of lack of interest.†**

Of the most intelligent 20 percent in the group of college age, fewer than half enter college and only about a third graduate from college. Educational authorities estimate that fewer than 2 percent of those in the college age group who are mentally equipped to obtain Ph D. degrees will actually obtain such degrees.

Another crucial stage is in the high

*U. S. Bureau of Labor Statistics, *Occupational Outlook Handbook* (Bulletin 940), p. 63.

†Charles C. Cole, Jr. (assistant dean, Columbia College, Columbia University), *Higher Education*, November 1955.

schools, where future scientists and engineers receive their first training in science and mathematics. There are serious weaknesses and signs of deterioration in this vital part of our educational system.

One-quarter of all American high schools offer no chemistry or physics. One-quarter offer no geometry. In many of the schools offering science and mathematics courses, the quality of instruction is low. Last year in the New York City school system alone more than 10,000 students were in science classes taught by teachers who were not trained in science.

This is a situation that threatens to become much worse. Between 1950 and 1955 the number of graduating teachers qualified to teach high school mathematics dropped 53 percent and those qualified to teach science dropped 59 percent. Furthermore, only about 60 percent of the graduates certified to teach mathematics or science in 1955 entered teaching as a career.

On the students' side — partly because of inadequate guidance programs — there has been a drift away from science and mathematics courses. The result of low student interest, and poor high school programs, in science and mathematics is virtually to foreclose careers in science and engineering to many bright young people. They miss the necessary basic training. Many who do attempt to obtain college training in these fields are ill-equipped. Engineering school deans report that fully half of their students enter with deficiencies in mathematics.

Misuse of Trained People

Scientific and engineering careers have long had a reputation for low salaries and limited opportunities for advancement. In recent years starting salaries have sky-rocketed and have been accorded wide publicity. But unfortunately there has been much less improvement in the salaries paid experienced engineers and scientists, especially in government and education. This has lowered the morale of experienced men and provided an incentive to desert engineering and research positions for higher paying jobs in sales or management.

Engineers and research scientists complain also that too much of their time now is spent on tasks that draftsmen and technicians could perform. Unfortunately for easy solution of this problem, however, there is an acute shortage of technicians as well. Worse still, there are indications that some companies in industries using large numbers of engineers have gobbled up technical manpower at a faster rate than they can effectively employ these scarce people.

Another drain on the supply of newly-trained scientists and engineers is military service. About 8,000 of this year's 27,000 engineering graduates were in ROTC programs and committed to active duty after graduation. Dr. A. W. Davison, chairman of the Engineering Manpower Commission of the Engineers Joint Council, says that in most cases no attempt is made by the Armed Services to assign these young officers to duties for which their engineering education specifically prepared them. They are not only withheld from industry and education for two years but also are not utilized in defense programs requiring more engineers and research scientists.

Some of the causes for the present shortage of scientists and engineers — bad advice a few years ago and a college age group held down by depression birthrates in the 1930s — are gradually being overcome. But others, such as the deterioration of science and mathematics training in our public schools and the many instances of ineffective utilization of scarce technical talent, enjoy no such prospect of automatic correction. The final editorial in this series will deal with some practical suggestions for meeting these problems.

This is one of a series of editorials prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

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Two Ways to Get Naphthalene from Petroleum

Dealkylate—
by hydrogenation—methylnaphthalene contained in refinery streams

Extract—
with solvents and centrifugation—small amounts of naphthalene from refinery streams

Can They Compete with Coal?

Naphthalene, long a stalwart of the coal chemicals, may soon be forced to divide its allegiance between coal and oil as a result of three oil companies' active investigation of processes for winning the chemical from refinery streams.

Just when the three—Sinclair, Sun and Atlantic Refining—will get into production is anybody's guess. But one thing is certain: recent statements by naphthalene producers that present capacity is sufficient for the next five years are not acting as deterrents to their efforts.

Sinclair distributed naphthalene samples some time ago, and although it admits there are technical problems still to be solved, it is pushing ahead. Sun originally hoped to distribute samples this summer, but has not yet come out with them; its program is still active, however. Atlantic, meanwhile, admits it is several months behind the others with its investigation.

Question of Economics: The best route to petroleum naphthalene seems to be dealkylation of methylnaphthalene by hydrogenation (*CW Technology Newsletter, Feb. 11*). A second way —concentration of naphthalene already present in refinery streams—is ruled out by most experts. They contend that although the total amount of naphthalene present in refinery streams may be great, any one stream would have only small amounts, making concentration uneconomical. Yet, Atlantic says this method should not be disregarded completely.

The main advantage for the methylnaphthalene route is the relatively high concentration of this starting material in some product streams from catalytic crackers.

Though methylnaphthalene is probably less stable than many of the other methyl-substituted aromatics, the methyl groups are much more difficult to remove than are alkyl groups of two or more carbon atoms. Dealkylation with a common clay-type catalyst at low pressure gives poor yields. At high pressure, yields are better, but equipment costs are considerably higher. One possible solution of the problem is described in a patent recently issued to Socony Mobil. The process: hydrogenation over silica-alumina catalyst at atmospheric pressure.

Methylnaphthalene charge stock and hydrogen are heated to 900-1,200 F and passed downward through a bed containing silica-alumina cracking catalyst. Contact time of 1 to 20 seconds reportedly yields 70% naphthalene (based on total product weight), although several passes through the reactor may be required. Concomitant by-products are gas (mainly methane) and coke.

The charge stock may be composed of almost any methyl-substitute naphthalenes (e.g., mono-, di-, tri- and tetra-methyl-; methylethyl-; methylisopropyl-; dimethylethylnaphthalenes) or their mixtures. The hydrogen would most likely come from refinery reforming operations and could be premixed with the methylnaphthalene or mixed in the reactor itself. The catalyst would preferably contain 8-15% alumina; the balance, silica.

Since Socony Mobil has no immediate plans for naphthalene production, development of the process hasn't been pursued. But the patent (U.S. 2,750,432) is indicative of the type of approach that's called for.

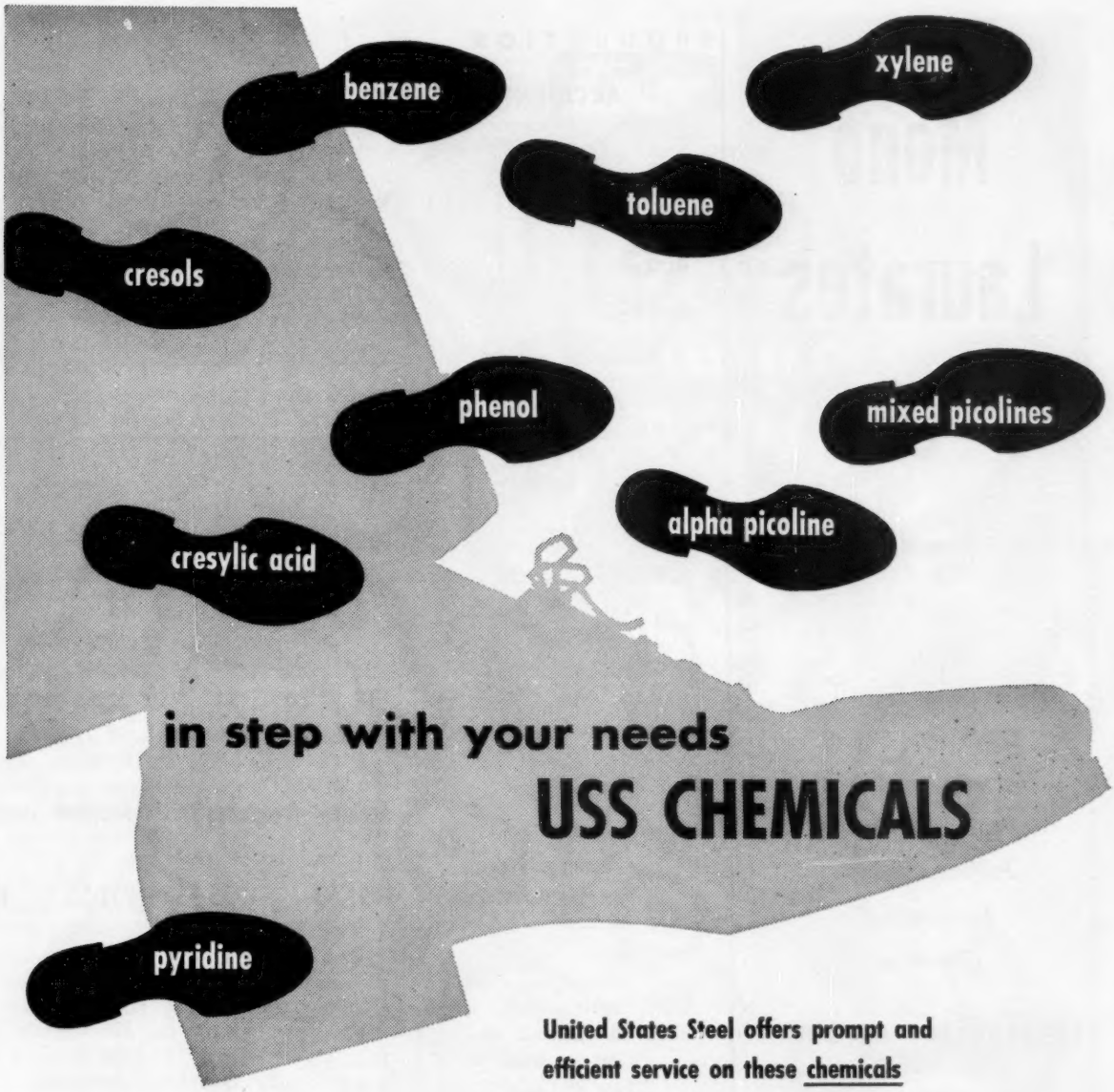
Direct Route: The concentration of the small amounts of naphthalene already contained in refinery streams requires a solvent extraction process. One known method is to extract with methanol or ethanol. After flashing off the solvent, the rich oil is centrifuged two or three times to recover crystallized naphthalene.

Sinclair holds a patent on this direct routes (U.S. 2,686,818), but deems it uneconomic for large-scale production. Reason: unless the feed contains at least 20-25% naphthalene (which it normally doesn't), the quantities of liquid required are too great to be handled practically.

Pennsylvania Industrial Chemical's Ugite unit will produce naphthalene along with other chemicals by thermal cracking crude petroleum. But it's a refinery in itself, doesn't solve the basic problem of utilizing by-products in refinery streams.

Phthalic anhydride, which consumes about 80% of all naphthalene production, can be made directly from methylnaphthalene. But this route is not as attractive as other direct conversions of petroleum products (e.g., Oronite's phthalic-from-*o*-xylene process). For one thing, phthalic yields from methylnaphthalene oxidation are low. Too, the large amount of heat generated by the conversion makes it difficult to control reaction temperatures.

The main problem facing any petroleum-based process is how to compete with coal processes. Petroleum naphthalene is reportedly purer, but estimates are that it can't sell at less than 8¢/lb. Naphthalene prices fluctuate considerably; crude now runs about 6-7¢. Imports at about 3¢ flooded the market last year, but new phthalic anhydride plants in Europe may keep much of this naphthalene at home in the future. If they do, petroleum naphthalene may find ready entry into the market, and may help to minimize price fluctuations.



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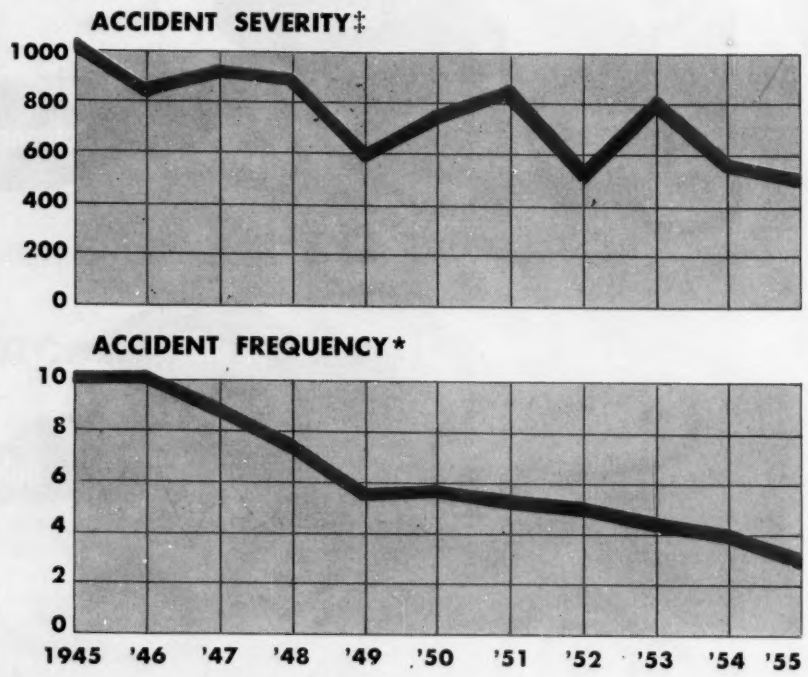

Chemical Process Industries	Accident Frequency* 1951-53	Accident Frequency* 1953-55	Accident Severity‡ 1951-53	Accident Severity‡ 1953-55
Acids	5.97	4.87	1130	859
Alcohol and wood distillates	7.28	7.90	740	568
Chlorine and alkali	5.17	5.10	870	976
Coal-tar products	10.56	8.91	1120	2236
Fats and oils	10.45	9.61	780	912
Fertilizers	12.51	11.41	2270	2522
Fuses and powder	4.93	2.82	2250	1461
High explosives	2.85	2.11	3570	1873
Industrial gases	11.04	7.98	1450	753
Laboratories	1.89	2.05	200	262
Paints and varnishes	5.85	4.78	380	350
Pharmaceuticals, fine chemicals, cosmetics	6.49	5.36	300	349
Photographic film	5.75	4.89	240	412
Plastic materials	2.21	2.16	610	496
Salt	17.74	12.13	570	996
Soap and glycerine	6.38	4.18	450	588
Synthetic fibers	1.36	1.57	320	186
Synthetic rubber	3.77	3.61	700	599
All chemical process industries	**5.03**	**3.90**	**730**	**642**

*Frequency rate is number of disabling injuries per 1 million man-hours of exposure.

‡Severity rate is number of days lost per 1 million man-hours of exposure, including charges for permanent disabilities and deaths.

CPI Safety Record in '55 Is Best Ever

Chemical plants were safer places in which to work in 1955 than in any of the previous 30 years, according to figures just released by the National Safety Council. But the industry's showing—particularly with regard to severity—still leaves room for improvement.

Records show that the accident frequency rate, which has dropped every year since 1946 (except for 1950), continued downward in 1955. And accident severity, which has followed an erratic pattern in recent years, dropped to a new low. Compared with other industries, the chemical industry (which includes 18 process industries as defined by NSC) compiled the sixth best record in accident frequency; but it stood only seventeenth in accident severity.

The chemical industry's accident frequency rate—measured by the number of disabling injuries per million man-hours worked—was 3.21 for 1955, a drop of 22% from 1954. Its severity rate—measured by the number of days lost per million man-hours worked—was 521, a 9% decrease from 1954.

Individual Standings: Perhaps of greater interest are the 1951-53 and 1953-55 records of the chemical process industries that collectively make up the statistics reported above (*see table*). They not only show where the individual industries stand, but also give a better indication of trends.

Synthetic fibers manufacturers had the best safety record, but the more hazardous process industries—explosives, fuses and powders, industrial gases—made big gains.

Atomic Energy Record: The Atomic Energy Commission's accident record, reported separately from that of the chemical industry and industry in general, rated a spotlight of its own. AEC's over-all frequency rate of 2.01 for 1955 won an Award of Honor from NSC. This would place it second only to the communications industry.

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Chemical Clothing: A special blend of Dynel and cotton has been developed by Chem-Wear, Inc. (Darien, Conn.), to combine comfort with durability in its newest line of chemically resistant work clothes. Dynel provides durability in rugged service, says Chem-Wear, while the use of cotton improves moisture absorption, minimizes the static buildup that makes some synthetic fabrics cling to the wearer.

•

Pilot Positioner: Johnson Service Co. (Milwaukee) is out with a new fast-acting pilot positioner that, it says, provides extreme accuracy of control even for very small changes in air pressure from the controlling instrument. Operating on a 15-20-psi. air supply, the unit makes maximum power available at all times for repositioning the controlled device; it features adjustable starting points and operating ranges, a by-pass switch and indicating gauges.

•

Air Monitor: Wallace & Tiernan Inc. (Belleville, N.J.) has a new Solvay chlorine detector that monitors air continuously, sounds alarm when chlorine concentration exceeds 3 ppm.

Burning Out the Boron

HEART of an ultrarefining process developed by Bell Telephone Laboratories for the production of semiconductor silicon is a moving molten-zone oxidation that reduces even boron—the most difficult impurity to remove—to less than 1 part per billion. Process developer H. C. Theuerer (*left*) and coworker J. S. Doyle view the molten zone (supported only by surface tension) as a vertical silicon rod moves through it (*above*). Boron in the molten zone reacts with a mixture of hydrogen and water vapor that flows around the rod; boron then passes off as vaporized oxide.

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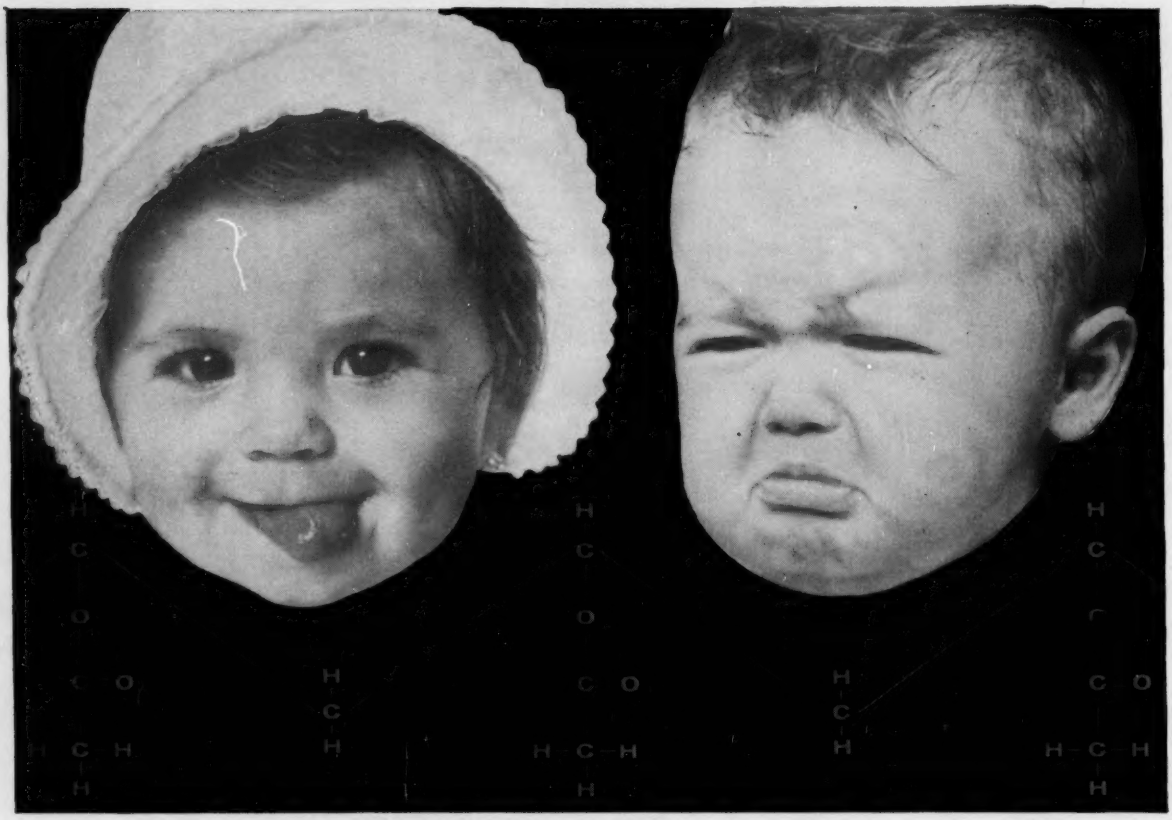

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CHEMICAL WEEK
August 25, 1956

Philadelphia and Reading Corp. will scale up its pilot operations for making synthesis gas and hydrogen by gasifying anthracite. It will go ahead with a large, semicommercial plant near the Trenton labs of Hydrocarbon Research, which will design and build the plant and supervise operations. Although synthesis gas production from the new plant is expected to be sizable, no commercial use for it is envisioned at the moment. The unit is being built primarily to gather engineering data for a full-scale project.

The big feature of the process is that it will employ finely powdered anthracite directly. Both fine sizes of anthracite and anthracite silt, a former waste product of hard-coal operations, have been used successfully by Hydrocarbon Research in the pilot plant. Philadelphia and Reading reports that the process has side-stepped the problem of caking and clinkering that have plagued other investigators.

What's more, the gasification is said to effect oxygen savings through the use of relatively low temperatures and high pressures.

•

Sharply increased federal grants for basic chemical research will be okayed next week by the National Science Foundation. Officials will ask NSF's board of directors at their Aug. 24 Woods Hole, Mass., meeting to approve the first quarterly allotments of grant money of the $16,250,000 the foundation will award in fiscal '57. NSF's research grants totaled $9.9 million last year, $1,187,000 of which went for 83 chemistry grants. If the same ratio holds, basic research in chemistry will benefit by approximately $3 million this year.

Meanwhile, Surgeon General L. E. Burney, in office less than a month, this week awarded 3,967 research grants totaling $48,879,678 from fiscal '57 funds appropriated to the National Institutes of Health. It was the largest amount of money ever granted to support medical research on major diseases and in basic sciences related to medicine.

•

British Ceca Co., Ltd. (London) is building a new plant near Londonderry, North Ireland, to make activated charcoal from peat. The process uses powdered coal, features very high temperature in a turbulent stream. Charles Tenant & Sons is a partner in the venture.

•

Radiation measurement and absorption in various materials will get plenty of study in a new $2-million radiation physics lab that Du Pont has decided to build at the firm's experimental station. It will be operated by the engineering department.

It will have equipment to generate a variety of high-energy atomics particles and rays, will supply fundamental data for radiation studies now being conducted in various departments of the company. Completion is scheduled for Jan. '58.

Fluidized processing of atomic wastes is getting careful scrutiny by Argonne National Lab, the Atomic Energy Commission revealed in its recent semiannual report.

Radioactive waste solutions of aluminum nitrate are sprayed into a heated bed of aluminum oxide maintained in a fluidized state by air. This drives off water and converts the aluminum nitrate into the oxide. Nonvolatile radioactive materials remain in the oxide.

Because the oxide has a smaller volume than the original material, the technique is regarded as a potential way of cutting costs in waste treatment. Also, the material can be stored without concern about its corroding through the container.

•

In the same report, AEC revealed some developments in the pyrometallurgical reprocessing of spent fuel. Both Ames Laboratory and Atomics International are working on processes that are essentially solvent extractions with a molten metal as the solvent. When brought into contact with the spent fuel, a metal like magnesium or silver can take up most of the fission products while remaining immiscible with the uranium.

And although not mentioned in the report, Oak Ridge National Laboratory is working on the hermex process. This involves dissolution of spent fuel elements in boiling mercury.

The idea behind all these treatments is to avoid complete purification by turning out a metal that's just good enough to be fed back to a reactor. That's all that is needed in fast reactors, which are less critical of neutron-absorbing products than thermal reactors are.

Added advantages: high-temperature processing obviates the need for long cooling-off periods (prior to reprocessing); it isolates fission products in a more compact form, permits the metal to be handled in its metallic state (instead of having to convert it into the salt).

•

Germany's BASF has developed a new electrochemical process for making sodium hydrosulfite. It says only that the process does not use zinc dust. (The classical preparations for hydrosulfite involve either the reduction of the bisulfite with zinc dust or the reaction of zinc dust in formaldehyde with sulfur dioxide, followed by treatment with soda ash.)

•

The brand of gasoline you use in your car can make a difference in the life of your piston rings. At least, that's the conclusion of Laird McKee, a graduate student at Oregon State College, who studied six commercial premium gasolines, used radioactive tracers to measure wear. He found that the wear rate—which differed in the gasolines tested by a factor of 10—increased in proportion to the amount of excess scavengers present in the antiknock additive.

A message from Du Pont to chemists who might need

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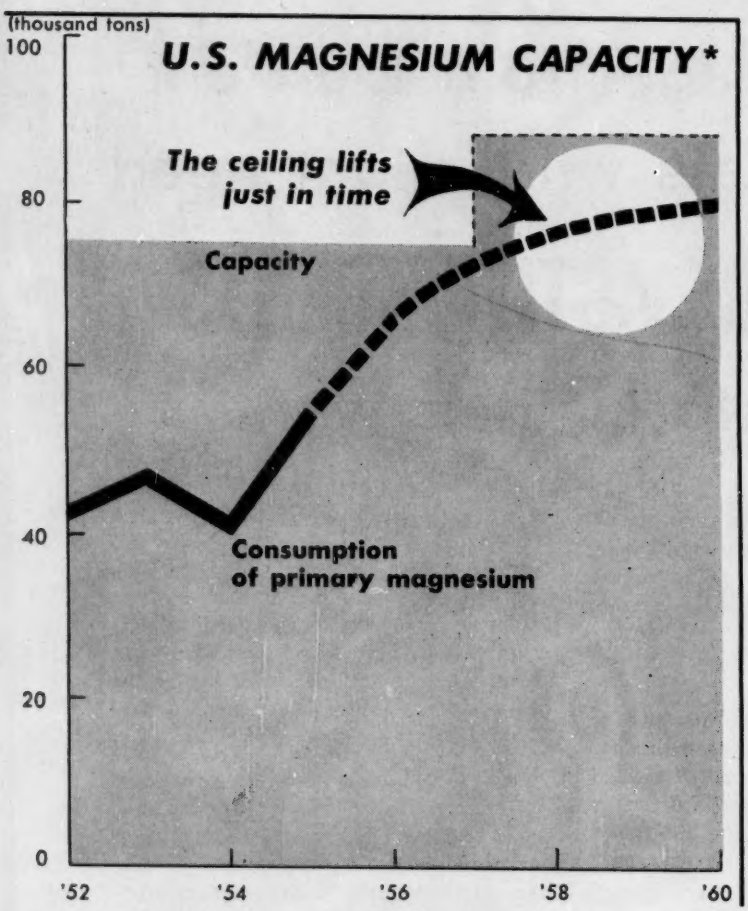

Magnesium Moves Up

Next year, at long last, the U.S. will have a second commercial magnesium producer, and the prospect seems to please just about everyone with an interest in the industry.

One reason: the new producer, Alabama Metallurgical, will provide the major part of a much-needed boost of U.S. primary magnesium capacity—to 88,500 tons from the present 75,000 tons/year—which will more than match an expected capacity-crowding demand of 75-80,000 tons by 1960.

AM (jointly owned by Brooks & Perkins, Detroit, and Dominion Magnesium, Canada) plans a $7-million, 10,000-tons/year plant at Selma, Ala. (*CW, July 21, p. 18; July 28, p. 68*), expects to begin operations sometime in '57. Until now, Dow Chemical has dominated the business, and just about everybody is glad to see the new entry. Here's why:

Back in '52, the government's so-called Paley report recognized the growing importance of magnesium in civilian as well as military uses. It anticipated a total magnesium market of 100,000 to 1 million tons by 1975 (the actual amount depending on interim technological progress), and indicated a probable demand of some 80,000 tons by 1960.

Not all industry observers agreed with the forecast; some, in fact, labeled it "fantastic." But last year, for the first time, civilian uses accounted for more than 50% of all magnesium consumed in this country; and it now seems likely that demand will increase fast enough during the next few years to push consumption into the range predicted for 1960.

Such a demand would strain—if not overtax—operating U.S. magnesium capacity. Dow now operates two plants in Texas: its own 30,000-tons/year unit at Freeport, and a 45,000-tons/year government-owned plant at Velasco. These two plants provide the bulk of U.S.-produced magnesium going into civilian and military uses.

(Besides the Dow-operated plants, the 5,000-tons/year government-owned magnesium plant at Canaan, Conn., supplies the Atomic Energy Commission. Security restrictions shroud operations, and current output is not public knowledge. Also, Basic Magnesium reportedly makes magnesium from magnesium chloride in a recycle operation—in connection with titanium production at Henderson, Nev.)

But Dow isn't sitting still while Alabama Metallurgical moves to get plant construction under way, is currently modifying its Freeport facilities to provide an approximately 10% capacity boost. When this expansion is completed late this year, the company's total private magnesium capacity will be 33,500 tons/year.

Meanwhile, the emergence of AM as a second commercial magnesium producer may actually help Dow in its other plans.

It's no secret that Dow, in 1952, was eager to buy the government's Velasco plant; but the Justice Dept. turned thumbs down on the deal, said the sales would give Dow a monopoly on magnesium production. Consequently, the firm has been forced to operate the plant under a lease that will expire in Jan. '58.

What will Dow do, now that another producer is on the way? A company spokesman has this to say: "Should the Justice Dept. fail to approve purchase of the Velasco plant by Dow during the coming year, the magnesium requirements of the country during the next few years can be met only by extension or renewal of the lease. Ultimately, Dow may be forced to consider further expansion of its private facilities, since the uncertain leasing arrangement is obvious-

*Capacity figures do not include the 5,000-tons/year government-owned plant at Canaan, Conn., nor Basic Magnesium's plant at Henderson, Nev. Both are considered "noncommercial" producers.

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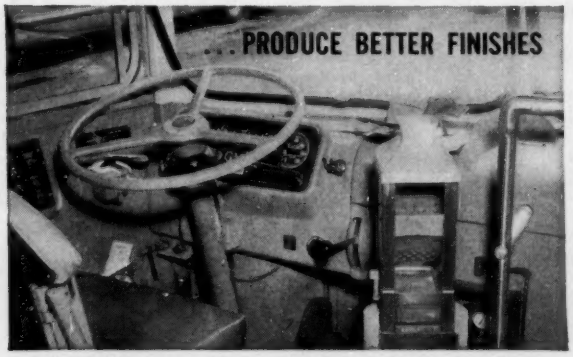

SAFETY COMES FIRST with the Cleveland, Ohio, Transit System. That's why the System's 50 new 48-passenger buses have a driver's area finished in multicolor lacquer based on Hercules® nitrocellulose. The easy-to-clean multicolor finish minimizes glare and prevents reflection from sun and headlights. (*Described in U. S. Patent No. 2,591,904, held by Coloramic Coatings, Inc., Los Angeles.*)

EXPANDING CONSUMPTION—The use of natural and synthetic rubber has more than doubled in ten years. To anticipate future demands, Hercules has constructed this pilot plant at Hattiesburg, Mississippi, where new rubber chemicals are being readied for commercial production.

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Typical reactions of TRIETHYL ORTHOFORMATE

$HC(OC_2H_5)_3 + ROH \rightarrow HC(OR)_3 + 3C_2H_5OH$
Alcohol → Trialkyl (Aralkyl) Orthoformate

$HC(OC_2H_5)_3 + RR'C=O \rightarrow RR'C(OC_2H_5)_2 + HCOOC_2H_5$
Carbonyl Compound → Acetal or Ketal

$HC(OC_2H_5)_3 + CH_2(CN)_2 \rightarrow C_2H_5OCH=C(CN)_2 + 2C_2H_5OH$
Malononitrile → Ethoxymethylene Malononitrile

$HC(OC_2H_5)_3 + CH_3CBrHCOOR + H_2 \rightarrow (C_2H_5O)_2CHCH(CH_3)COOR + C_2H_5OH + HBr$
Alpha-Brom-Propionic Ester → Acetal of Formyl-Propionic Ester

$HC(OC_2H_5)_3 + C_6H_5COCH_3 \rightarrow C_6H_5COC_3H_7 + HCOOC_2H_5 + C_2H_5OH$
Acetophenone → Phenyl Propyl Ketone

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ly unsatisfactory as a basis for sound production planning."

By serving such notice to the government, and pointing to the fact that acquisition of the plant would no longer automatically give Dow a monopoly on the magnesium business, the firm stands a good chance of gaining complete control of the Velasco unit as early as '58.

Alabama Metallurgical's plans may also have indirect effects on the future of the government's plant at Canaan, Conn. When the new firm starts producing the high-purity magnesium required by AEC, the government may well terminate production at Canaan, or perhaps sell that plant, since it is reluctant to remain in the business.

For example, in 1953, when national stockpile requirements for magnesium neared fulfillment, several government-owned plants discontinued operations. U.S. magnesium production that year dropped to 93,000 tons, from a peak output of 105,800 tons in '52.

Since then, production has continued to decline; in '54, it dropped to 69,700 tons, and in '55—when, for the first time in several years, no ingot magnesium went into the national stockpile—it declined another 12%, to 61,300 tons.

This year, however, output is again on the rise, may hit 68-70,000 tons.

Purity Gambit: Alabama Metallurgical's magnesium production will apparently have little competitive effect on Dow, even though a company spokesman says actual production may well exceed rated capacity. AM will produce magnesium by the ferrosilicon process—the method now used by New England Lime at Canaan.

Magnesium obtained by the ferrosilicon process is somewhat purer than that derived by electrolysis, has a minimum specification of 99.95% or better, contains 500 parts/million of total impurities; grades containing only 150 parts/million of impurities can be supplied. Electrolytic magnesium has a minimum specification of 99.8%, contains about 2,000 ppm. of impurities.

Electrolytic magnesium is, of course, entirely satisfactory for the uses it's intended for; but there is now a large and rapidly growing field of application where higher-purity magnesium is either essential or highly desirable. These applications appear to offer

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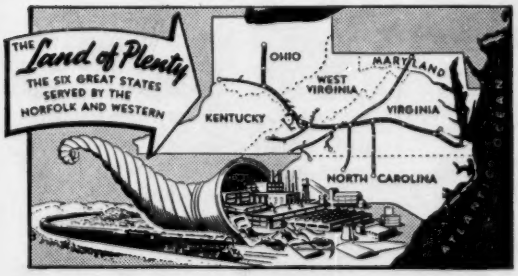

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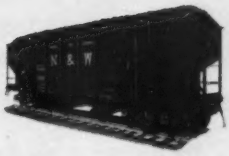

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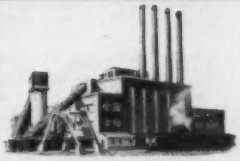

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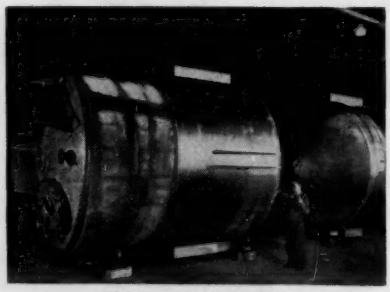

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the best markets for the forthcoming output by Alabama Metallurgical.

For example, use of high-purity magnesium as a reducing agent is essential in the refinement of uranium and zirconium. (The Canaan plant now provides high-purity magnesium for the reduction of uranium tetrafluoride to metallic uranium.)

Zirconium is becoming increasingly important in construction of nuclear reactor parts and equipment, requires high-purity magnesium for its manufacture. Present and contracted production of zirconium already indicates a need upwards of 1,000 tons/year of magnesium—and presumably much of this will be supplied by the Alabama plant.

Titanium produced by the Kroll process uses magnesium for the reduction of titanium tetrachloride. Standard-grade magnesium is now used at the rate of some 10,000 tons/year, but it's likely that substantial amounts of high-purity magnesium will also be used in the future in order to improve titanium quality.

Cathodic protection may not seem to offer much of a market for high-purity magnesium—standard grades and lower grades derived from scrap can be used to protect pipelines, ship hulls, and similar installations—but special application may, in some cases, warrant the use of the high-purity material.

Magnesium plates for photoengraving and printing are becoming more popular, and specially high-purity material is needed for high-grade engravings. Brooks & Perkins currently imports magnesium for this purpose from Canada at a cost of about 51¢/lb., will eventually supply this need with metal produced by Alabama Metallurgical.

Several new magnesium alloys containing zirconium and rare earth metals—already in large-volume production—can be made from standard-grade magnesium; however, the high-purity metal is also expected to find application in this field.

With many new and expanding uses for magnesium in the offing, the coming capacity boosts will come none too soon. But they will come soon enough to provide at least temporary relief to those worried magnesium marketers who, a few months ago, foresaw a serious supply pinch shaping up, hoped for a hint of increased output.

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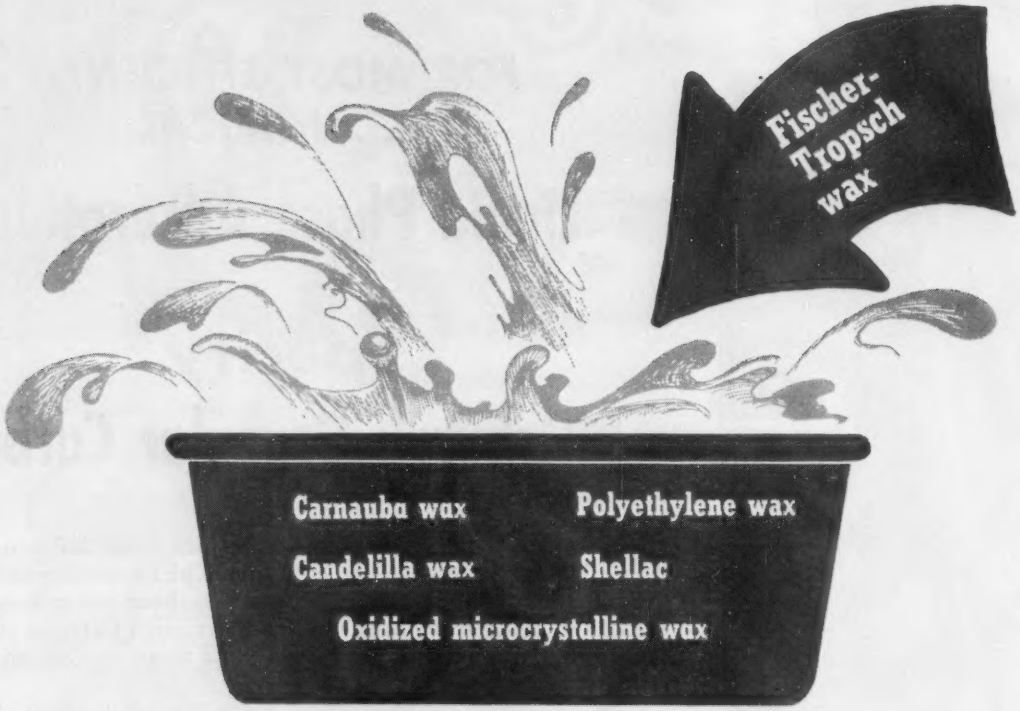


Stirring a New Wax Into the Polish

There's no question that carnauba wax is the first choice of most polishmakers. But this expensive wax, with its qualities of unmatched hardness, high gloss, toughness, and ease of formulation, has some serious shortcomings—its quality (purity) varies greatly, its availability and price fluctuate disturbingly. The over-all result has been that substitute waxes are now playing an increasing role in U.S. polish manufacture.

The arrival, just a few weeks ago, of 15 tons of wax from South Africa's Sasol Corp. helps point up this expanding market for substitutes—and in particular, it underlines the striking gains of waxes produced by the Fischer-Tropsch process. The Sasol supply, first from that source to hit the U.S. market, is being sold here by agents Moore & Munger. (New York); it joins Dura Commodities Corp. (New York) as a source of these synthetics. Dura, which first introduced F-T waxes in late '53 and followed it with an oxidized, emulsifiable form in '54, gets its supplies from Krupp Kohlechemie (in western Germany).

Dura calls its emulsifiable series Duroxons; its nonemulsifiable series, FT. Moore & Munger has tagged its nonemulsifiable products Paraflint, and has not yet revealed whether or not it will offer an emulsifiable grade. Possibility: some U.S. firm might make emulsifiable waxes here from the Sasol raw material.

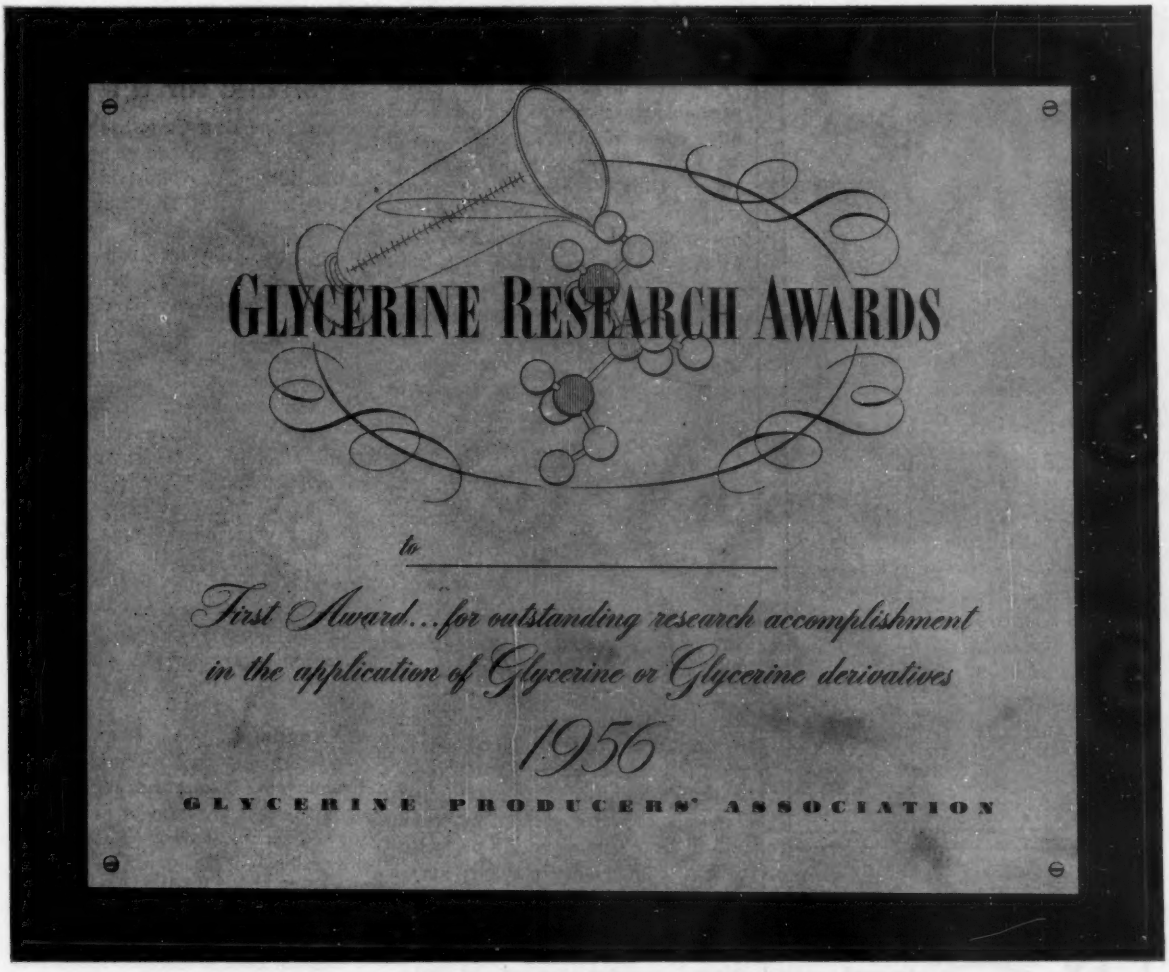
During their relatively short period of availability, Fischer-Tropsch waxes have nabbed a number of users, large and small. Already, more than 100 polish producers are using them on a production basis, including some top-volume manufactures of private-brand products.

United States consumption (not all for polishes) was about 20 tons/month in '54; it reached about 40 tons/month in '55, and this year is in the 50-tons/month range.

Although suggested for a variety of applications*, F-T waxes are aimed largely at the $225-million polish field, a market that has doubled in value in the past seven years. According to a just-completed survey by the U.S. Dept. of Commerce (*see p. 80*), the main segments of the polish market are these: auto polish, valued at $22.1 million in '54; furniture polish, $17.1 million; floor polish, $95.6 million (water emulsion types, $69 million; other liquids, $18 million; paste and cake $6.6 million; other, $1.8 million).

Pluses Aplenty: Helping make it a leading contender as a polish base (in either solvent- or emulsion-type polishes) are a number of qualities: like most of the synthetics, it's uniform in quality, purity, availability, price; it's pure white (the emulsifiable forms are slightly yellowish), gives a clear, nonslip film that can be buffed to high

*Among these: paper coating, boosting hardness of paraffin waxes, altering the water-permeability of polyethylene (and improving its stiffness). The list is long, and wax suppliers are eager to expand it.



Announcing the 1956 Glycerine Research Awards

FIRST AWARD	**Honor Plaque**	**$1,000**
SECOND AWARD	**Honor Certificate**	**$300**
THIRD AWARD	**Honor Certificate**	**$200**

The purpose of this group of awards, established in 1952 by the Glycerine Producers' Association, is to recognize and encourage research leading to new and improved applications of glycerine or glycerine derivatives to products or processes. The work may concern itself with the chemical, physical or physiological properties of glycerine, or with properties of glycerine-containing or glycerine-derived materials. It may deal with applications which of themselves are currently or potentially of value to industry or the general public, or it may deal with scientific principles or procedures likely to stimulate future application. Originality in extending the application of glycerine into new fields of usefulness will receive special consideration for awards.

BASIS OF ENTRY

These awards are open to any individual in the United States and Canada engaged in research, whether employed in industry or affiliated with a governmental or educational institution (faculty or college student) except those connected with member companies of the Glycerine Division, Association of American Soap & Glycerine Producers, Inc., or laboratories which they employ. (Joint entries by research teams or associates of two or three individuals are also eligible.)

PERIOD OF AWARD

First consideration for the 1956 Award will be given to work which has come to a successful conclusion or clear-cut point of accomplishment during the current year, regardless of the date at which the work was initiated. Work carried on in previous years, but the significance of which has been confirmed by commercial application in 1956, will be eligible.

JUDGES

Selection of award winners will be made by a committee of three judges of outstanding reputation and appropriate scientific background, having no connection with the Association or its members.

DATE FOR NOMINATIONS

All nominations for the 1956 awards must be received by *November 1, 1956.*

METHOD OF NOMINATION

Only nominations made on the official entry blank will be eligible for awards. For a copy of this official entry blank, write to: *Awards Committee, Glycerine Producers' Association, 295 Madison Avenue, New York 17, N. Y.*

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gloss, and is compatible with most vegetable waxes, resins, polymers, and other common additives†.

And most important, F-T waxes are cheap. Dura's emulsifiable products sell in the 42-60¢/lb. range; its nonemulsifiable types, 26-35¢/lb. Moore & Munger is offering its nonemulsifiable types for 17-24¢/lb.

The good compatibility of these waxes makes it simple to blend them with other products to get specific properties—addition of carnauba, to improve the hardness of water-emulsion films, is widely practiced.

Formulation with the new waxes presents few problems, according to suppliers, except that melting points, slightly higher than conventional vegetable waxes, demand somewhat higher operating temperatures.

Source Note: These novel waxes are among the numerous products of the Fischer-Tropsch synthesis, a versatile process that has seen great use in Germany and France, and which has recently been tried in South Africa.

A forerunner of the Oxo process, which is currently in the news, Fischer-Tropsch converts carbon monoxide and hydrogen into a string of hydrocarbon compounds—gasoline, diesel oil, waxes. The high-melting (100-105 C), hard waxes refined from this process are suitable for use in solvent-thinned polishes typified by automobile and furniture paste polishes.

Much like petroleum's microcrystalline waxes, F-T waxes can be oxidized to make emulsifiable waxes—suitable for the dry-bright, liquid products that make up the bulk of U.S. floor polishes.

Substitute Fight: Qualified now for all types of polishes, F-T waxes are up against plenty of rugged competition. Aiming for the markets that carnauba seems to disdain are a host of materials—vegetable waxes, such as ouricuri, candelilla, and sugar cane; resins, both natural (e.g., shellac) and synthetic (e.g., polystyrene); mineral waxes, such as montan and microcrystalline petroleum types; synthetics, such as polyethylene.

It all adds up to a real battle among suppliers of new polish raw materials, and some really difficult decisions for the formulators to make. So far, only the consumer can look upon the polish battle with the assurance that he, at least, can't lose.

†Duroxon (emulsifiable) waxes are able to "carry" nonemulsifiable F-T waxes in some formulations.

Systemic for Shell

Shell Chemical Corp. has gone into commercial production of its first systemic insecticide, Phosdrin. As one of the firm's first phosphate-type insecticides (Shell is best known for chlorinated products, such as aldrin and dieldrin), it is now being pushed for experimental use on cotton and such food crops as tomatoes and lettuce (plus about 20 others). Experimental tolerance of 1 part per million has been established.

Prime advantage of the novel systemic (chemically, 2-carbomethoxy-1-methylvinyl dimethyl phosphate), according to Shell, is the speed with which the chemical disappears after application. It does its insect-killing job within a few days (three at most), and is said to then become greatly reduced in toxicity. It is, however, quite toxic before application to plants, and must be handled with caution.

Phosdrin is produced at Shell's Denver plant, and will be sold to formulators. It may be applied, the company says, by spray or in granular form. Technical-grade Phosdrin is now selling for $4.50/lb.

PATENTS

Lanolin Left: A shampoo that leaves a residue of lanolin on the hair has been worked out by Jack Verblen (Chicago). He suggests a formulation of lanolin with an amide formed by the reaction of mono-isopropanolamine and a high-molecular-weight fatty acid (about 70% of the amount of the lanolin). The lanolin makes up about 15% of the total formula. The amide prevents the lanolin from destroying the lathering properties of the rest of the shampoo.

•

Magnetic Ink: U.S. bankers have recently suggested the use of some type of magnetic ink to permit mechanical processing of checks. Now, the Burroughs Corp. has developed an ink for this purpose (British patent 748,763). It makes use of 50%-70% ferromagnetic compound (in the form of particles smaller than 5 microns, and made of such materials as hydrogen-reduced iron, electrolytic iron, Swedish sponge iron, or "carbonyl" iron) dispersed in a carrier medium (e.g., glycols and organic esters).

from GAF...high pressure acetylene derivatives with 3 centers of reactivity

$HC{\equiv}CCH_2OH$ Propargyl Alcohol

a chemical intermediate and corrosion inhibitor

NEW: ELIMINATES HYDROGEN EMBRITTLEMENT

Low concentrations of propargyl alcohol in acid pickling baths inhibit or completely eliminate hydrogen embrittlement. Bend angles of 180° are obtained in a modified Zapffe method of testing. A special data bulletin is available on request.

Concentration of Inhibitor Based on Acid Content, Per cent by Weight	DEGREE OF ARC OBTAINED			
	Propargyl Alcohol	2-butyne-1, 4 diol	Commercial Inhibitor "A"	Commercial Inhibitor "B"*
0.00	69	69	69	69
0.25	180	48	43	68
0.5	180	54	36	180
1.0	180	59	77	123
2.0	180	150	103	145
4.0	180	123	66	133
8.0	180	130	133	180

*Contains 11% propargyl alcohol.

chemical intermediate:

Propargyl alcohol, $HC{\equiv}CCH_2OH$, with its three centers of reactivity, primary alcohol, triple bond and active hydrogen, has proven itself a valuable tool in the synthesis of pharmaceuticals, essential oils, agricultural and specialty chemicals.

corrosion inhibitor:

Propargyl alcohol is an excellent corrosion inhibitor for mineral acids and stabilizer for chlorinated solvents.

properties:

Propargyl alcohol is a colorless, stable liquid, infinitely miscible in water, benzene, ethanol and other organic solvents.

$HC{\equiv}CCH_2Br$ Propargyl Bromide

a chemical intermediate and agricultural soil sterilizer

chemical intermediate:

Propargyl bromide, $HC{\equiv}CCH_2Br$, has three centers of reactivity; triple bond, bromine atom, and acetylenic hydrogen. Synthesis of terpinoid structures such as vitamin A, plant growth hormones, etc., is possible through Reformatsky-type reactions. Some propargyl amines and propargyl ethers synthesized from propargyl bromide have physiologic activity as morphine antagonists and hormones. Used in the synthesis of propargyl substituted barbiturates.

soil fumigant:

Propargyl bromide has been found to be highly effective as an agricultural soil fumigant.

properties:

Almost colorless liquid, insoluble in water, soluble in ethers, benzene and hydrocarbons.

For technical information, price schedules and samples write to:

ANTARA gaf

ACETYLENE CHEMICALS DEPARTMENT

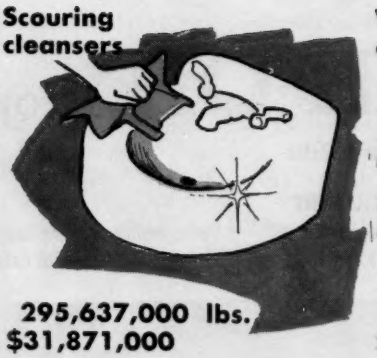
ANTARA® CHEMICALS

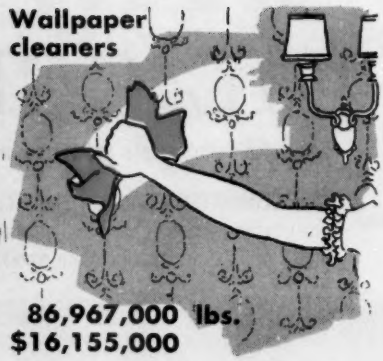
A SALES DIVISION OF

GENERAL ANILINE & FILM CORPORATION

435 HUDSON STREET · NEW YORK 14, NEW YORK

From Research to Reality





Bright New Record for Cleaners, Polishes

Striking growth for floor and auto polishes highlights a just-out Dept. of Commerce report on the "Cleaning and Polishing Preparations Industry," the first since 1947.

The report* shows a broad picture of expanded use of general cleaners, points up noteworthy gains registered by specialties for cleaning household equipment and removing rug stains. All told, polish and specialty cleaner makers in the U.S. do close to a $500-million/year business.

Here are a few key figures from the new tabulation (*see drawings*):

• Things were especially bright for automobile cleaners and polishes—output is up 50% in the seven-year period, while dollar volume has tripled. This reflects, in part, high automobile production.

• Floor waxes and polishes have registered a 20% volume production gain, while nearly doubling sales volume—they account for almost one-fifth of the total industry output. Liquid polishes (water emulsion and others) account for four out of five sales dollars spent in this category; pastes account for the rest.

Other Side of the Coin: There are several weak areas, though, particularly shoe polishes, paper and wall paper cleaners.

• Shoe polish production is barely holding its own with an increase of a little less than 2% over '47. Reshaped price structure—25¢ cans are now the largest sellers—has permitted a substantial dollar-value gain, however. Whether new aerosol shoe polishes, such as recently introduced Sprayola (*CW, Aug. 11, p. 73*), can spur shoe polish sales growth remains to be seen.

• Wallpaper cleaners and general wall cleaners actually decreased 20% in production, with sales figures (in terms of dollars) off by 1½%. The total market value for this type of cleaner is now roughly $16 million.

Overhead, Labor, Location: Behind the surface changes—in production, sales volume—are alterations in manufacturing costs, labor and the like. Cost of manufacturing specialties for cleaning is rising—labor force has increased about 27% in seven years, while wages have advanced 82%. But increases in productivity and a 20% increase in work-time have in many cases offset the higher wage pattern.†

New hourly wages for production workers range from $1.60 to as much as $2.27 in some instances. The largest wage difference is found in the Southern states. The Central states have the highest-paid workers, reflecting generally higher labor costs in that region.

Almost 70% of the manufacturers of these polishes and cleaners are located in the Eastern industrial belt. The South accounts for a little more than 20% of the industry, while the New England states hold 9.5%.

New marketing methods, increased production and prosperity account for a large part of the gains of these cleaning industries. Aggressive merchandising, too, has played its part in this spectacular boom—the greatest in the records of specialties makers.

*Covers the years 1947 through '54. Supplementary data on wages from U.S. Dept. of Labor, Report on Earnings, Aug. 1955, dated April 1956.

†The gain for the individual worker has been less spectacular—a 30% wage increase since '47. However, if dollar depreciation is counted, this equals a real increase of only 9%.

Chicago, Illinois . . . where Dow caustic serves alkali formulators.

DOW

wherever you're producing

DEPENDABLE CAUSTIC SODA DELIVERY IS ASSURED FROM DOW

Dow is the one producer, you know, supplying caustic soda to industry everywhere. Wherever you produce, you're *sure* of getting rapid, dependable service from Dow.

The *three* modern Dow plants and *six* additional shipping terminals . . . stretching from Bayonne, New Jersey to Los Angeles, from Chicago to Freeport, Texas . . . start the order to you immediately on your teletype, wire or call. Ocean-going tankers, inland barges, tank cars and tank trucks . . . the full facilities of the industry's most extensive and flexible distribution network go to work without delay, getting Dow caustic to you *now*.

Then, too . . . Dow customers benefit from continual process research, stringent quality control in plant and in transit, prompt field technical service. Does Dow have *your* order? THE DOW CHEMICAL COMPANY, Dept. AL 756B, Midland, Michigan.

you can depend on DOW CHEMICALS DOW

assurance to vinyl compounders—

INDOIL

OXO ALCOHOLS

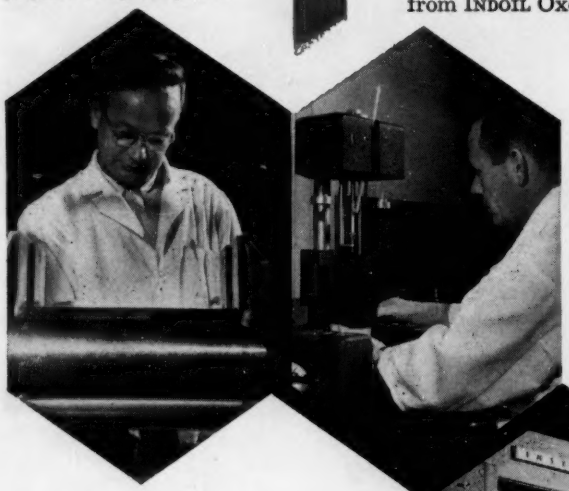
are evaluated in finished plastic compounds

INDOIL Oxo Alcohols produce uniformly high quality plasticizers. This is regularly check-tested in finished plastic compounds by INDOIL's plasticizer evaluation laboratory. Compounders and molders get this benefit and assurance when they specify plasticizers made with INDOIL Oxo Alcohols.

If you are manufacturing vinyl products that require:

- Low volatile loss
- Resistance to extraction
- Low temperature flexibility
- Good electrical properties
- Resistance to heat and light

check your esterifier. Get plasticizers manufactured from INDOIL Oxo Alcohols.



INDOIL plasticizer evaluation laboratory checks quality of INDOIL Alcohols by testing derived esters in finished vinyl compounds. Here operator prepares a vinyl compound.

Typical properties of esters prepared from INDOIL Oxo Alcohols

	DIOP	DDP	DIOA
Specific Gravity 20/20	0.981	0.965	0.928
Color, APHA	< 25	< 25	< 25
EMC* phr at 1,600 psi	51.4	53.7	43.6
Refr. Index n_D^{20}	1.486	1.484	1.447
Visc. cs at 20°C.	74	120	18
Temp. at 100,000 Stokes, Vis., °C.	–42	–39	–70

*Equivalent Modulus Concentration

For additional information, write for INDOIL Oxo Bulletins.

Testing low temperature flexibility at INDOIL plastics evaluation laboratory.

Instron data are recorded to determine equivalent modulus concentration. Staff of trained plasticizer chemists make evaluations.

INDOIL

CHEMICAL PRODUCTS

INDOIL CHEMICAL COMPANY

910 South Michigan Avenue, Chicago 80, Illinois

CHEMICAL WEEK
August 25, 1956

Isocyanates made news in two quarters last week. First, Carwin (North Haven, Conn.) made two new isocyanates commercially available; then, later in the week, Mobay Chemical (the Monsanto-Farbenfabriken Bayer offspring) posted some slashing price reductions (up to 36%) on basic chemicals for urethane surface coatings.

One of the Carwin products, polyaryl polyisocyanate (PAPI) is tabbed "helpful" in increasing resiliency and in raising the heat distortion point of flexible and rigid urethane foams. The other, n-butylisocyanate—because of its reported reactivity and hydrophobic characteristics—is expected to find application in waterproofing textiles, in stepping up the wear resistance of wool, and in tanning dried hides and skins rapidly and simply.

Mobay's drastic reductions on isocyanate and polyester resins, which are the basis for its Mondur/Multron surface-coatings system, are aimed at making urethanes "strongly competitive pricewise with other synthetic industrial coatings systems," says the company's General Sales Manager J. D. Mahoney.

Further, domestic production during the past year has supplanted imports as the predominant supply source, resulting in savings in import duty and transportation costs. These savings, says Mobay, are being passed along to the coatings market.

The cuts range from 7¢/lb. on Mondur-C isocyanate (now $1.05¢/lb. in quantities of 10,000 lbs. or over) to 38¢/lb. for Mobay's Mondur-S isocyanate now tagged 85¢/lb. (10,500 lbs. or more). Add, too, a 15% "service" reduction to paint and adhesives makers who formulate and market finished products using Mondur-C. Reason for the supplemental discount: to enable paint and adhesive manufacturers to provide technical service and assistance to their urethane product customers.

•

In the aliphatic organic market, crude glycerine prices continue to slip as they have since early this year (*CW Market Newsletter, Feb. 11; April 29*). The latest drop brings domestic crude soap lye material down a cent, to 16¢/lb.; saponification grade to a shade over 17½¢ from a previous 19¢/lb. quote.

According to most trade followers, the new domestic price skid can be attributed to a weakening in foreign crude prices; Argentine and European material are reportedly available on the basis of 15¢/lb., c.i.f., N.Y.

The continuing crude softening hasn't had too much effect on refined glycerine tags; demand for the latter has barreled along since early summer, but there may be a change brewing. Indications are pointing, some believe, to a possible break in prices in the last quarter. One reason: ample stocks.

There's little, if any, improvement in the tight selenium supply situation that has prevailed for more than a year (*CW Market Newsletter, Aug. 20, '55*). Although producers' prices are firm at a high $15.50/lb., set after the $5/lb. hike early this year, most resellers continue to get $8-10/lb. more than that. Noted in the trade, however, is a singular lack of interest on the part of dealers

to buy the larger lots (100-200 lbs.). Reason: individual export licenses are for 25-, 50-, and 100-lb. lots, and these are being quoted at $23-25/lb.

•

In Washington, soybeans are wrinkling some brows. The lush crop in prospect for the fall harvest has Agriculture Dept. experts worried. And with output in other countries also up, the traditional large export market will be harder to tap, particularly if recent forecasts of a 20% increase over last year's record U. S. production pan out.

Thus, for the first time, USDA officials are concerned that price-depressing chronic surpluses, which have plagued other crops, will soon catch up with soybeans. Possibility: prices may be knocked down from their customary high perch toward the far lower government support levels.

•

Finally, commercial quantity isophthalic acid is here; Oronite is shipping carloads from its rated 50-million-lbs./year plant at Richmond, Calif. The deliveries come after a long start-up delay—first onstream target date was Oct. '55—caused by mechanical failures when key equipment (valves, pumps) failed to function under process conditions.

Isophthalic, at 23¢/lb. c.l. or truckload, will buck highly competitive phthalic anhydride; its price will be freight-equalized against the latter for all domestic points.

•

Sidelight on CW's coverage of the magnesium situation (*see p. 70*): Many trade followers are unaware that official figures on U. S. consumption of magnesium have been revised by the Bureau of Mines. Duplication of data relating to the metal's use as a reducing agent in the production of titanium, zirconium and hafnium led to exaggerated figures for the 1951-53 period.

Corrected output data, as reported in the agency's Mineral Markets Report No. 2428: 1951, 33,756 short tons; 1952, 42,397; 1953, 46,943. Though released at a much later date, USBM Bulletin 556, *Mineral Facts and Problems,* carries the incorrect magnesium production figures. These, however, will be revised in the bureau's upcoming *Minerals Yearbook.*

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending August 20, 1956

	Change	New Price
UP		
Castor oil, No. 1, Brazilian, tanks	$0.0025	$0.1825
Tallow, No. 1, special tanks, dlvd.	0.00375	0.0675
Tankage, animal feeding, 9-11%, Chicago, bulk, unit-ton	0.25	5.50
DOWN		
Tung oil, dms., c.l., N.Y.	$0.0025	$0.2525
Citronella oil, Java-type, cns.	0.10	1.45

All prices per pound unless quantity is stated.

MONTAGUE *a new name in Acetylene Chemistry!*

Montague is the name of a coming new chemical center in Lower Michigan. Acetylene—a basic building block in organic chemical synthesis—is playing a major part in the area's development. A new LINDE plant now under construction at Montague will soon be producing acetylene for some of America's biggest chemical producers.

Raw Materials Available in the Montague Area

Anhydrous hydrogen chloride, used with acetylene by DuPont to make neoprene; and chlorine, caustic soda, and hydrogen are now available at Montague from Hooker Electro-chemical Company, whose new plant is already in production. Dry lime hydrate and lime slurry will also be available from LINDE in large quantity at by-product cost.

A Place for Your Plant in the Montague Area

In the Montague area are many top-notch sites for plants within pipeline distance of LINDE's volume acetylene. If located here, your plant will also have the convenience of other chemicals near by, many obtainable by pipeline.

In addition to raw materials readily available, the Montague area offers other attractive advantages: • Electric power in ample supply • Fresh water in unlimited quantities • Transportation by rail, truck, or water • Numerous major markets in the vicinity.

Sources of Acetylene

UNION CARBIDE, source of acetylene gas, will be shipped to the new acetylene-generating plant at Montague from Sault Ste. Marie, Michigan. Other sources of UNION CARBIDE, assuring dependable supplies of acetylene, are at Ashtabula, Ohio, and Niagara Falls, New York. Still another UNION CARBIDE plant is at Portland, Oregon. Pipeline acetylene can be purchased by meter, or UNION CARBIDE in bulk can be shipped to chemical processors from any of these plants. Also, there are drum stocks for industrial users at 111 warehouses in the United States.

Give Us A Call!

Whatever your own plans or requirements may be, now or projected for the future, we are ready and able to help settle your acetylene supply problem. For technical and sales information, or plant site data, telephone or write to LINDE's Carbide Acetylene Department at the address below.

LINDE AIR PRODUCTS COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities

The terms "Linde" and "Union" are registered trade-marks of Union Carbide and Carbon Corporation.

PLAY PERIOD: A-D-M sales personnel have tough handicap—keeping sales pitch off the green.

Business Builder: Sport-Shirt Sales Seminar

Sporting newly acquired tans and clutching briefcases stuffed with "hot" sales-promoting ideas, some 60 paint manufacturing executives broke camp at Minnesota's Gull Lake recently and headed back to work. They—not company salesmen—were the guests at a four-day, clinic-type, sales meeting hosted by Archer-Daniels-Midland.

Spiced with frolic, this type of sales meeting, A-D-M reports, is proving an excellent way to foster future sales. The evidence: this year's session was the sixth such "Northwoods Paint Sales Workshop" the company has sponsored.

Aim of the workshop is threefold:

- To acquaint A-D-M salesmen with customer personnel they don't usually meet. The guests, chiefly company presidents, owners and marketing executives, are generally important purchasing influences.
- To give company personnel a clear understanding of customer marketing problems and activities.
- To boost customer paint sales, hence stimulate demand for A-D-M raw materials.

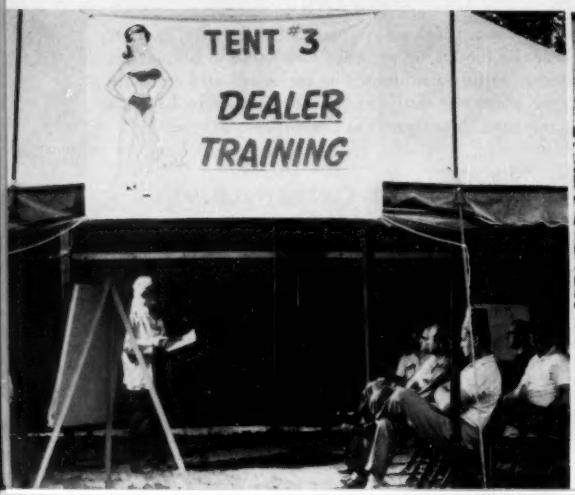
Planning for the sales clinic begins five months in advance. Salesmen suggest the people (not necessarily customers) to invite, the home office works up a program and motif (nautical this year), and 100-120 invitations go out. Acceptance rate: about 60%. Some 40 A-D-M representatives, who are briefed with biographies of the guests, are hosts, and take part in the discussions and skits. Top A-D-M management executives are also on hand.

The workshops are oriented almost exclusively to sales topics. Highly spirited skits vie with serious "buzz" sessions* in putting A-D-M's points across.

Subject matter (suggested by the guests) for the five buzz sessions held

*A discussion group, guided, not lectured, by a trained leader.

WORK PERIOD: 'Buzz sessions' encourage audience participation, spread paint selling know-how.



Better-known in Bhowani Junction than we are in Boston?

Penick recognized years ago that international trade must be a two-way street. So export and import became inseparable twins that now account for a substantial portion of our business. And because we obtain our basic materials from practically every civilized country in the world, we're frequently better-known in many parts of the world than we are at home.

Here, even our best friends all too often associate Penick with botanicals alone *although more than three-quarters of our business is in manufactured products!*

From Penick plants flows a diversified range of drugs and fine chemicals* used by more than a hundred different industries. Many are derived from the botanicals for which we are famous. Alkaloids and extracts are good examples. They're used in medicine, foods, cosmetics and in some of our most important pesticides. Others such as our line of specialized antibiotics are in no way related to botanicals.

The essential fact is that Penick offers you a single source for many different chemical needs. You benefit by our broad experience in many related fields. Problems in one are frequently solved by knowledge gained in another. If you do not know all the ways we can serve you, we shall be happy to send particulars in response to a letter outlining your needs.

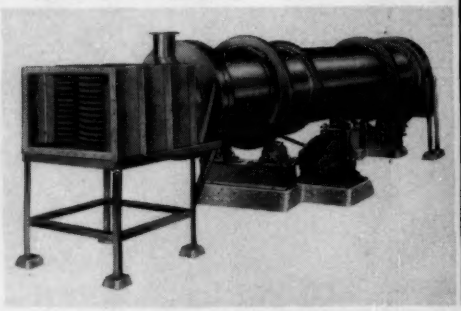
**and many fine chemicals also available from our affiliate, the New York Quinine & Chemical Works, Inc.*

PENICK

Manufacturers of Fine Chemicals and Drugs

S. B. PENICK & COMPANY 50 CHURCH ST., NEW YORK 8 735 W. DIVISION ST., CHICAGO 10

2′ - 3″ dia. x 14′ - 0″ long
DAVENPORT ROTARY HOT AIR DRYER



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Continuous DeWatering Presses

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Steam Tube, Hot Air and Direct Fire

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Water and Air

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for the manufacturing of CHIP BOARD.

Recent development in the manufacturing of CHIP BOARDS permits the use of all types of wood waste from wood working industry.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog B For quick reference consult your Chemical Engineering Catalog.

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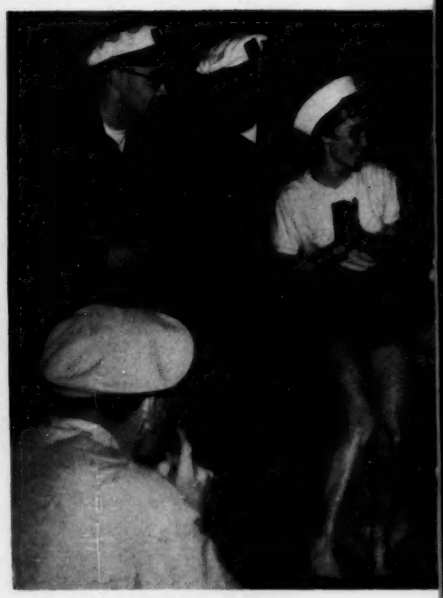
WALLACE & TIERNAN INCORPORATED
BUFFALO 5, NEW YORK



POINT-MAKER: Skits and girl mascot

this year: recruitment and selection of salesmen; human relations; dealer sales training; selling color; sales planning.

Topic coverage in the buzz sessions is surprisingly comprehensive. The session on dealer sales training, for example, probed job requirements, educational background, personality factors, use of application blanks and interviews, psychological testing, reference checking, and a case-history problem. Also included: discussion of an opinion survey of retail paint clerks.

To spark interest in the various activities, A-D-M introduces a spirit of competition by splitting the group into five teams. Awards are given for such things as the best team-created skit, best golf score, biggest fish, and the best "bell-ringer." A bell-ringer is any unusually effective sales idea, from actual experience, that can be told in 90 seconds or less.

As a follow-up, A-D-M sends its guests a complete transcript of the proceedings and a souvenir picture album.

Conspicuously absent from the workshop: promotion of A-D-M and its products. Introducing a self-serving sales angle, the company believes, would mitigate the goodwill created by showing paint producers that A-D-M is interested in solving paint marketing problems. The company does, however, sponsor a tour of its research

amatize elements of a sales problem.

facilities in Minneapolis before the group boards buses for Gull Lake.

What makes a customer sales clinic a success? According to A-D-M, the most important factors are:

- Achieving a balance between work and play. Although desirable, play shouldn't be overstressed. Most visitors come to learn, not to find fun. Hence, A-D-M confines frolicking to evenings and one afternoon.
- Allowing guests to participate. Sessions must provide maximum opportunity for everyone to contribute.
- Scheduling a full program. This boosts the meeting's value both socially and informationwise, avoids impression that the affair is dragging.

Dividends: The immense generation of goodwill and enthusiasm to beef up paint merchandising techniques is undoubtedly the biggest benefit that A-D-M reaps from its workshop. Letters from most of the guests go far beyond mere "thank you" notes. Typical: "Received about $10,000 worth of ideas"; "accomplishments are going to have a large impact on the industry"; "a six months' course covered completely in a few days;" "if I lost my notebook, I would lose thousands of dollars;" ". . . marvelous hospitality and friendship left a huge impression on me. Am better sales manager now than a week ago."

These are the real business benefits spawned from a customer sales clinic.

All of these securities having been sold, this advertisement appears as a matter of record only.

NEW ISSUE

August 9, 1956

Trinity Equipment Corporation

$250,000

6% Subordinated Debentures

(Due July 1, 1976)

40,000 Shares

Common Stock

(Par Value $1.00)

Price $1,160 per Unit

(Each Unit: $1,000 6% Subordinated Debenture and 160 Shares Common Stock)

Copies of the Offering Circular may be obtained from the undersigned.

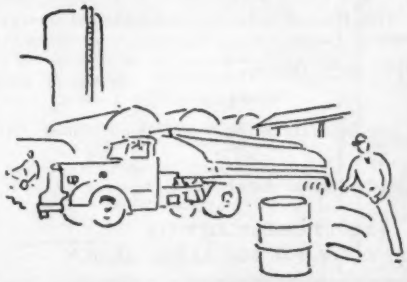
SCHUSTER & CO., INC.

44 Wall Street — New York 5, N. Y.

WE SUPPLY

PLASTICIZERS

from our *NEWARK* warehouse



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Dibutyl Phthalate
"Flexol"* Plasticizer DOP
"Flexol"* Plasticizer 4GO
Tricresyl Phosphate

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KETONES
ESTERS
GLYCOL ETHERS
PLASTICIZERS
CHLORINATED SOLVENTS
GLYCOLS
AMINES
AROMATIC SOLVENTS
ALIPHATIC NAPHTHAS

* Registered Trade Mark U.C. & C.C.

THE CP CHEMICAL SOLVENTS INCORPORATED

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- **Closing Date**—Each Tuesday, 11 days prior to publication date.

- **Undisplayed Rate**—$1.80 a line, minimum 3 lines. To figure advance payment, count 5 average words as a line. 10% discount if full payment made in advance for 4 consecutive insertions. Position wanted ads ½ above rate.
- **Box Numbers** count as one additional line.

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General Manager

Fuel Oil Distribution and Terminal Operations

Our company is an established leader in the wholesale and retail distribution of fuel oil in a major East coast metropolitan area; we also operate a large terminal for storage and handling of oil and liquid chemicals. We have an opportunity for a results-minded young man to assume the responsibility for managing the company's operations, including the main plant, two subsidiary terminals and the company's barges and fleet of trucks. Also he will engage in contacts with suppliers and important customers and participate in trade association activities.

- **This man should be a good organizer and able administrator. He should be versatile and broad-gauge in his thinking and able to command the respect of other executives**
- **He should have the capacity and the desire to become Vice President at an early date—and the potential to become President.**
- **Familiarity with the oil industry and terminal operations is desirable.**
- **Preferred age: early thirties.**

Starting salary will be in the low five figure range with ample opportunity for advancement.

Replies will be acknowledged and treated in complete confidence.

FS 2763 CHEMICAL WEEK
CLASS ADV. DIV. P.O. BOX 12 N.Y. 36, N.Y.

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Required by prominent suburban metropolitan N. Y. C. pharmaceutical Co. entering Steroid field. Candidate to be capable of heading Chemical development section. Salary open. Send full resume including desired salary to P2632

Chemical Week
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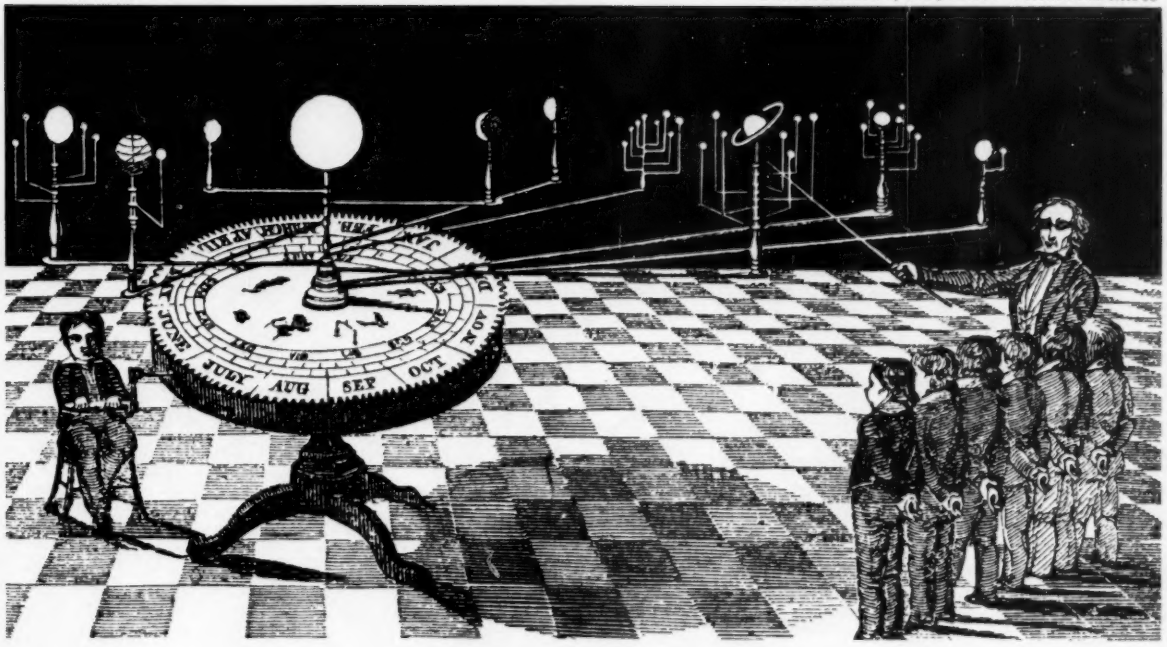

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